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HOLWELL'S FIRE-ESCAPE.

Although quite a number of fire-escapes have been recently brought before the public, the subject has not been exhausted. Much experience has been acquired, which has revealed original defects in these agencies, and this has led to the invention of useful improvements for rendering them better adapted for rapid and practical application. A "fire-escape" should combine the qualities of being easily and quickly brought to the scene of danger; also a capability of applying it easily and safely. The accompanying illustration represents an improved fire-escape, as applied to the saving of life in a lofty building, the under stories of which are on fire, and escape in the ordinary way—by stairs—cut off by the flames.

A series of ladders—two or or more—which may be able to reach the highest stories of buildings, are employed in this fire-escape. These ladders are so connected together as to slide upon one another, and be drawn out so as to form a continuous ladder, as shown by the illustration, for being raised up against a building by the power of block and tackle, to rescue persons from dangerous situations, These ladders slide upon one another so as to occupy but a very small space on the carriage when they are not in use.

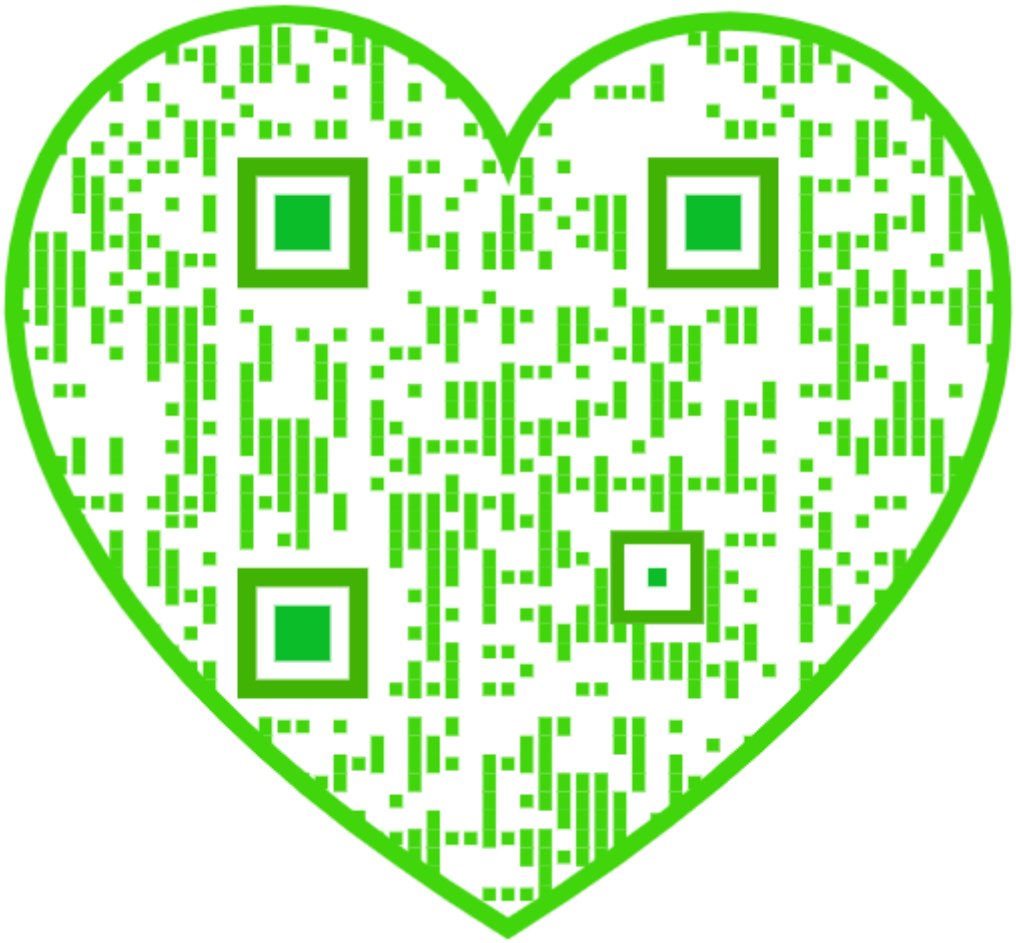
The nature of this invention consists in arranging the arch supports or legs, usually called "tormentors," which serve to elevate and keep the ladders steady, with wheels or rollers at their lower ends, and with suitable sockets to receive the ends of pointed rods which are attached to the truck, in combination with ropes extending over a windlass in such a manner that by turning the latter the arch supports serve to assist in elevating the ladders; and when elevated, the truck and fire-escape can be easily drawn along, say from window to window, and from house to house in a block. The arch supports are also connected together by an adjustable cross-brace in such a manner that they can be brought close together or stretched further apart, as circumstances and situation may require.

A double truck is employed as a carriage for the fire-escape. The front and back trucks are connected together by a long reach, and they are arranged similarly to the carriages of hook and ladder companies. When the apparatus is drawn to a fire, the truck is removed in the usual manner—as shown at the one side, with one fireman moving it. The fire-escape—composed of the ladders, their supports and the windlasses—is secured on one truck, A, of the carriage. The under or base ladder, B, is attached to an axle, *a*, which passes through the legs into the sides of the truck.

HOLWELL'S IMPROVED FIRE-ESCAPE.

There are two windlasses, C C′, which have their axles secured in the frame of the truck. Wire ropes extend from the windlasses over the blocks, D D′, on the ladders, and also pass over the windlasses, C, and are attached to the legs of the supports. A rope is attached to each side of the top ladder to act as guys for keeping the escape steady. F F are two adjustable supports or legs, called "tormentors." They are attached to the sides of the lower ladder by pivot joints, and they have wheels or rollers on their lower extremities. These supports are united together by an adjustable brace, G. They rest upon the ground and form a support to the ladders, so as to combine strength and firmness, and, at the same time, they permit the escape to be moved easily in position from window to window, a very important consideration. The adjustable brace, G, having a clasp at its middle, permits the two bars of the brace to slide past one another, so that the legs, F F, can be greatly distended or brought close together as circumstances may require. Two adjustable rods, *b b*, are also connected with the truck, and the legs, F F, render the latter firm and steady.

When this fire-escape is run to a fire and is placed in position, the levers, L, of the windlasses, C C′, are alternately turned by the firemen, when the ropes are wound-up and the ladders elevated, as shown, with wonderful rapidity. At the same time, as the legs of the supports or "tormentors," F F, are drawn out into place, they assist to elevate the ladders and to sustain them firmly and safely for persons to ascend and descend with security. A chain is connected with the tongue of the truck and the back end of the frame; and a small ladder is employed to ascend and descend from the ground to the top of the truck frame. Suspension braces are also employed to stiffen the lower ladder, B, and to answer the purposes of a perch for uniting the trucks. This fire-escape is portable and is designed to be run to any distance and place where there is a fire, and to be there applied. It embraces great stability, combined with ingenious devices for ready adjustment and application in all cases. It is not only a convenient fire-escape but extension-ladder for painters and others, as it can be raised and lowered with great facility by simply turning the windlasses. We have been given to understand that this invention has met with deserved favor from several in authority in our Fire Department who have examined it carefully. It would cost but a small amount (to the city) to apply it to all carriages of hook-and-ladder companies, as the improvements may be applied to the common trucks and ladders now in use. A patent was issued for it on the 26th of June last, to J. J. Holwell, No. 184 East Twelfth-street, this city.



OUR SPECIAL CORRESPONDENCE.

A Comprehensive Glance at Texas—The Matchless Beauty of the Country—Great Agricultural Resources—Splendid "Opening" for Mechanics—Drouth, Yellow Fever, &c.—Dr. Kellum, the most Enterprising Man in the State.

KELLUM SPRINGS, Texas, June 10, 1860.

MESSRS. EDITORS:—Notwithstanding my delays of two whole days on the route, in just a week and a day from the time of leaving New York, I landed in Madisonville, Texas, 165 miles N.N.W. of Galveston, and 2,268 miles from your city. I have now been here more than a week, traveling about in all directions, making inquiries of all sorts of persons; and though most assuredly entirely unqualified to give a full and minute account of the condition and resources of Texas, it is possible that the very *newness* of my observations may impress me more powerfully with its salient features than a longer residence, and enable me to present more vividly those leadingcharacteristics which all the readers of the SCIENTIFIC AMERICAN would like to know in regard to this largest member of our confederacy.

Texas is a beautiful State. The land about Anderson (the county seat of Grimes county) reminds me very much of that about Worcester in Massachusetts, or of Roxbury, near Boston. The hills are not as high, but they have the same rounded and grassy summits, and the wild post-oaks with which they are adorned, though less beautiful when closely examined, can hardly be distinguished at a short distance from the apple orchards of New England. I am told that west of the Bazos, and north of Madison, a large portion of the State is quite as beautiful as the land about Anderson. The railroad running nortward from Houston, passes through the largest and most level prairie (with the single exception of the valley of the Sacramento in California) that I have ever seen; it is mostly uncultivated. We passed a number of deer—some within rifle shot; and they stood and gazed at us in bewildered astonishment as we rattled by them. I have walked over fifty miles within the last week, and have seen either deer or wild turkeys every day. This country—beyond any other country I have ever been in—abounds with animal life. Innumerable swarms of insects fill the air with their constant buzzing; nimble lizzards—brown, green and blue—dart across your path at every step; serpents in endless variety, including the deadly moccasin and rattle-snake, crawl in all the creek bottoms; and the woods are incessantly vocal with the songs of birds. This is not the case in all warm countries; the thing that most surprised me in the tropics was the strange stillness of the forests.

Cotton and cattle are the leading products of Texas. Cattle are able to subsist throughout the winter without feeding, and cotton bears much better than corn the extreme drought to which the State is very liable. In the northern part, wheat does remarkably well; and as this grain grows early in the season, it usually gets sufficiently advanced to be safe before the dry weather of summer commences. The raising of stock and cotton is profitable, and the State is rapidly advancing in wealth and prosperity.

Though the agricultural resources of Texas are doubtless greater than those of any other State, in manufactures it is behind all others, with the possible exception of Arkansas and Florida. In the wheat regions there are plenty of steam flouring mills, and in the pine regions plenty of steam sawmills, but beyond this the mechanics and manufactures are very few. At Houston there is a foundry and machine-shop, where even small steam engines are made, and there are two or three similar establishments at Galveston. But what would the northern machinists say to heavy castings at 6 cents per pound, and $8 per day for finishing-up! At the State Penitentiary at Huntsville, the manufacture of cotton and woolen cloth, of furniture and other articles, is carried on, and I am told that this brief summary embraces about all the manufacturing interests of this great State.

This comparative dearth of manufactures is to be attributed, in part at least, to the extreme heat of the climate. The temperature of the waters of the Gulf of Mexico is 86°; this is six degrees higher than that of the Atlantic under the equator, and the prevailing south-east winds waft their sickly and enervating influence up to the very foot of the mountains, almost unfitting all the inhabitants for labor, except the negroes. These sable salamanders can be taught to hoe and pick cotton, but they are generally wanting in the capacity to perform the operations of skilled and trained mechanics. The statement that the climate is sickly must in truth be qualified. It is true that the coast is subject to the yellow fever, which extends to Houston and 70 miles farther along the railroad to Navasota, and there is some little amount of chills and fever in most parts of the State; but, generally, the faces that I have seen wear a very healthy look—far better than will generally be found throughout the valley of the Mississippi.

Though the climate is enervating, there is a vast amount of energy in this young State. Houston and the other places along the railroad are doing an enormous business, and growing with great rapidity. I presume, however, the most enterprising man in the State is Dr. Kellum, who owns the establishment called "Kellum Springs." A cool, copious spring of strong sulphur water bubbles up at the foot of the hill; and Dr. Kellum has fitted it up with a beautiful marble curb, built a large hotel and a number of cottages, and made it the leading summer watering place of the State—the Saratoga of Texas. Four or five hundred guests assemble here at one time in the heat of the season, and it is said that there is more dancing done here, more flirtations carried on, and more matches made than in any other place in the whole country! The doctor regularly takes the SCIENTIFIC AMERICAN; he has established a brick-yard, built a steam sawmill, erected a dozen cottages for summer tenants, has 4,000 acres of land, a splendid flock of full-blooded merino sheep, is building a windmill to irrigate his fields, and is altogether a regular hard-headed, active, energetic, impatient, enterprising, go-ahead, full-blooded native American. B.

OUR WASHINGTON CORRESPONDENCE.

WASHINGTON, D. C., June 25, 1860.

MESSRS. EDITORS:—The session of Congress has come to a close, and though much has been done, many important measures have failed for want of time or a disposition to consider them. Such was particularly the case in regard to the bill to amend the patent laws. For six years the Commissioner and others interested in the patent business have urged such changes as experience dictated would be of adrantage to all concerned, but their exertions have proved failures; and now, after a bill had been matured and passed the Senate, it was strangled in the House as soon as it could be reached, and postponed until the second Wednesday in December next, for an alleged want of time, and when that period arrives some other dilatory plea will probably prevail to defeat it again.

A large number of copies of the Patent Office Report on Arts and Manufactures for 1859, have been ordered to be printed for distribution, including one copy to each patentee. Of the Agricultural Report over 200,000 copies are to be printed. An appropriation of $60,000 has been made for seeds, cuttings, and agricultural statistics for the current year.

The following are the principal heads of appropriations relative to the District of Columbia, made at the present session:—For the exterior of the Treasury Building, $350,000; for payment for labor and materials furnished for the Capitol Extension, $204,822; for the prosecution of the work on the Capitol Extension until June 30, 1861, the sum of $300,000; for the completion of the Washington Aqueduct, according to the plan and estimates of Capt. Meigs, and to be expended under his direction, the sum of $500,000; for the extension of the General Post-office, $70,000; for the Botanic Garden and payment of wages, $8,421; for converting the old Senate Chamber into a court-room, the old court-room into a law library, and for fitting-up the adjacent rooms for the use of the Supreme Court, $25,000; for fitting-up rooms in the center of the Capitol Building for the use of the Court of Claims, $3,000; for the support, clothing, and medical treatment of the insane of the District of Columbia, and members of the army and navy at the Insane Asylum, $30,000.

The District Attorney has been directed to report to Congress at its next session, the value and nature of the title to the property proposed to be purchased for extending the Capitol grounds. The large appropriations now made will add much to the business and prosperity of the city, and tend in a measure to its permanency as the federal capital of the Union.

An act was passed to-day, authorizing the Secretary of the Treasury to effect a loan of $21,000,000, redeemable in ten years, at a rate of interest not exceeding six per cent; this measure was adopted because such a change in the tariff as would meet the wants of the Treasury could not be agreed upon.

Congress has done an act of justice to the Assistant-examiners, and Second Assistant-examiners in the Patent Office, who have for some years been performing the duties of Examiners-in-chief, and First Assistant-examiners, by paying them the salaries of the respective grades in which they have so faithfully discharged the duties.

The Postmaster-general announces that, hereafter, the single rate of letter-postage between the United States and Switzerland, by the Hamburgh mail, will be 19 instead of 20 cents, pre-payment optional; the reduced rate of 19 cents being identical with that charged by the Bremen mail.

SCRIBE.

THE FIRING OF FURNACES.

MESSRS. EDITORS:—While the theme of the day is the economy of fuel for boiler furnaces, and steam jackets and superheating are topics of almost hourly discussion, it appears to me that one important point is neglected—that of properly *managing the fire*.

My experience has led me to believe that there is more fuel wasted by bare grates and irregular fires than any other cause. The common plan of firing with stationary boilers is to govern the amount of steam wanted by the amount of fuel kept in the furnace. This does very well where the amount of heating surface is small in proportion to the amount of steam wanted, such as in high pressure steamboats, &c., when the furnace can be kept full and all of the steam worked that can be generated; but for stationary purposes, where there is generally a greater capacity in the boiler in proportion to the amount of steam wanted, we must have some way of controlling the fire. Suppose, for illustration, that a furnace and boiler is so arranged that the necessary amount of steam can be made by using green wood for fuel, with all of the draft on, and that it should become necessary to use dry wood mixed with coal. The common plan would be to keep the furnace but partly full, leaving bare grate surface to counteract the effects of the better fuel; or else to fill the furnace full, when the steam will rise 10 or 15 lbs., and then let it burn entirely out and cool enough through the grates to stand another filling-up, thus making a waste of at least one-third of the fuel. Now, *my* plan of remedying this is to make a large furnace with a good proportion of grate surface, and to keep the furnace full, regardless of the nature of the fuel, and then control the effects of the fire by means of an air-tight slide damper in the stack, worked by a lever placed within convenient reach of the fireman, the damper rod to be marked with a scale of inches to show how much draft is on. By this means the steam can be kept at a uniform pressure all the time; and with a good draft, the fireman is prepared, in case of an emergency, to increase the pressure to any degree wanted in a few minutes, while, in filling up, the draft can be shut off to prevent cooling.

Let some of the legionary readers of the SCIENTIFIC AMERICAN try the plan, and they will be astonished to find that a fire which usually burns out in 15 minutes will last for 30 minutes, with an effect equally as great throughout that time. It may be argued that, with the draft shut partly off, the flame will not reach so far, nor do so much good; but admitting there is some effect lost in this way, the gain in other respects is two-fold.

JNO. RICHARDS.

Columbus, Ohio, June 30, 1860.

[We can endorse the utility and economy of the plan described by our correspondent, having seen it carried out successfully thirty years ago. The plan was to have the damper self-acting by controlling it with the pressure of steam, so as to throttle the draft.—EDS.

ILLUMINATION OF MINES.—The theory of the "safety lamp" for mines is that flame will not pass through the meshes of the wire gauze to ignite the gas in the mine, because the great extent of surface in the gauze exerts a very cooling power by radiation. The safety of the lamp is solely dependent upon the shield of gauze.

A SIMPLE APPARATUS FOR ILLUSTRATING THE ATOMIC THEORY.

There is probably nothing in the whole range of science which teachers have found more difficult to explain to their pupils than the law of chemical combination, and yet, by adopting the method of explaining the theory first and then stating the facts on which it is founded, and by using the little balls which Dalton originally employed to impart his ideas to his cotemporaries, there is nothing in the compass of human knowledge which is more easily understood. Indeed, it is the wonderful simplicity of this great law which excites the admiration of all who have examined it. It is the purpose of this article to suggest a slight modification of the simple balls of Dalton, and to call the attention of the numerous teachers among our subscribers to this apparatus, which will render a difficult matter exceedingly plain to the comprehension of their scholars.

Make three small balls of the same size, but of different materials, so that their weights may vary. Take the lightest substance possible, say the pith of elder or of corn-stalk, to represent the atom of hydrogen. Some substance a little more than six times as heavy as the hydrogen ball—perhaps cork—will answer for an atom of carbon, and some light wood fourteen and a fraction times heavier than the hydrogen will furnish the ball to represent an atom of nitrogen. The oxygen atom will be just half the size of the others, and of a substance to make it, though of half the size, eight times heavier than the hydrogen. This is Dalton's apparatus, of course extended to 64 balls of various weights to represent the 64 elements of which all matter, so far as we now know, is composed. The addition which we suggest is to represent the force of chemical affinity by a thread for drawing these several balls together. Provide a considerable number of the hydrogen balls, of the oxygen, &c., and then by fastening them together with a needle and thread in the proper groups, how easy it is to illustrate the several chemical combinations by which the great multitude of substances with which we are acquainted are produced! Of course the balls should be marked with the initials of the elements for which they stand, the hydrogen with H, the oxygen with O, the iron or ferrum with Fe, and so on. Fasten together an atom of hydrogen and an atom of oxygen, and the pair makes an atom of water. Produce a number of these pairs and place them in a cup, and the cabalistic characters (H O), which have so puzzled the boy's head, immediately become as plain as the initials of his own name. He sees that they stand for one atom of hydrogen and one of oxygen chemically combined, producing one atom of water, and that, in water, the oxygen weighs eight times as much as the hydrogen, and occupies one half the space.

Again, fasten two atoms of oxygen to one of hydrogen and we have an atom of the deutoxyd of hydrogen (H O2), that sirupy liquor in which the oxygen weighs 16 times more than the hydrogen and occupies precisely the same amount of space. The elementary constitution of all known substances may thus be clearly represented, and in a few hours exercise, the whole law of chemical combination may be so plainly displayed to a child's mind that he will wonder that any one ever found any difficulty in understanding it, and so forcibly impressed that he can never forget it. Of course, it is proper that he should be told that no one has ever seen one of these atoms; that if they exist at all, they are so small as not to be perceptible even by the miraculous power of the compound microscope; that, in short, the whole thing is a theory, which is universally regarded as probably true, because it explains all the known phenomena of chemical combination. The proportions of the elements in chemical combinations do always correspond with the atomic weights. For instance, neither seven nor nine ponnds of oxygen will combine with one pound of hydrogen, but either 8 13-000 lbs., producing water, or 16 26-000 lbs., producing deutoxyd of hydrogen.

It should be explained also that the form or forms of these atoms are wholly unknown. They may be globular or square, or wedge-shaped, or cylindrical, or of any other conceivable form, for aught we know. There are some facts in the connection of electricity with chemical affinity which we have thought might be explained on the hypothesis that the atoms are in the form of cylinders, perhaps short ones like coin. The pieces of wood, pith, &c., to represent the atoms, might be made in this latter form instead of balls, especially as in the form of coin they could be very conveniently fastened together.

SIMPLE EXPERIMENTS IN NATURAL MAGIC

Edward S. Browne, of Commack, N. Y., has sent us a batch of simple but interesting experiments in natural magic, for the amusement and instruction of our juvenile readers, and perhaps also some of the old ones. A few of these philosophical pastimes will be found described below; the others will appear next week.

OPTICAL AUGMENTATION.

Take a large drinking glass of a conical figure, in which put a silver coin, and fill the glass about half full with water; then put over it a plate and invert both quickly, that the water may not escape. You will then see on the plate a piece twice the size of the original coin, and, somewhat higher up, another of the original size. This phenomenon arises from seeing the piece through the conical surface of the water at the side of the glass, and through the flat surface at the top of the water, at the same time; for the conical surface dilates the rays and makes the piece appear larger; but by the flat surface the rays are only refracted, by which the piece is seen higher up in the glass, but still of its natural size. That this is the cause will be farther evident by filling the glass with water, for, as the coin cannot then be seen from the top, the larger piece only will be visible.

After you have sufficiently amused yourself with this remarkable phenomenon, you may give the glass to a servant, telling him to throw out the water and keep the two pieces of money; and if he suspect nothing, he will be not a little surprised to find one piece only.

ALTERNATE ILLUSION.

Through a convex lens of about one inch focus, look attentively at a silver seal, on which a cipher is engraved. It will at first appear cut in, as to the naked eye, but if you continue to observe it for some time, without changing your situation, it will seem to be in "relief," and the lights and shades will appear the same as they did before. If you regard it with the same attention still longer, it will again appear to be engraved; and so on alternately.

If you look off the seal for a few moments, when you view it again, instead of seeing it as at first, it will appear in relief.

If while you are turned toward the light, you suddenly incline the seal, while you continue to regard it, those parts that seemed to be engraved will immediately appear in relief; and, if, when you are regarding these seeming prominent parts, you turn yourself so that the light may fall on the right hand, you will see the shadows on the same side from whence the light comes, which will certainly appear extraordinary. In like manner the shadows will appear on the left if the light fall on that side. If, instead of a seal, you look at a piece of money, these alterations will not be visible, in whatever situation you are placed.

It has been suspected that this illusion arises from the situation of the light, and, in fact, M. Guyot observed that when he viewed it with a candle on the right, it appeared engraved, but, by changing the light to the left side, it immediately appeared in relief. It still, however, remains to be explained why we see it alternately hollow and prominent, without changing either the situation or the light. Perhaps it is in the sight itself that we must look for the cause of the phenomenon; and this seems the more probable as all these appearances are not discernible by all persons.

A SIMPLE, POWERFUL MICROSCOPE.

Make a circular hole in the shutter of a window which looks on open ground, and in this hole place a convex glass, either simple or double, whose focus is at the distance of five or six feet, the distance should not be less than three feet or the images will be too small, and there will be little room for the spectators. On the other hand, the focus should never be more than fifteen or twenty feet, for then the images will be obscure. Take care that no light enter the room but by the lens. Let the rays of light that pass through the lens be thrown on a large concave mirror, properly fixed in a frame. Then take a slip or thin plate of glass, and sticking any small object on it, hold it in the incident rays, at a little more than the focal distance from the mirror, and you will see on the opposite wall, amidst the reflected rays, the image of that object, very large and extremely clear and bright. This experiment never fails in giving the spectator the highest satisfaction.

WHO GETS THE PATENT OFFICE REPORTS?

MESSRS. EDITORS:—Can you, through the columns of the SCIENTIFIC AMERICAN, inform inventors how any one of them may procure a copy of the Patent Office report? Congress has appropriated large sums for printing thousands of copies for public distribution. The original design of this expenditure was certainly intended to benefit the inventor, and through his untiring energies and exertion, bring back an abundant harvest into the public treasury. Has this design been carried out? is a question that needs no answer here. A few copies only are granted to the Commissioner, and when an inventor asks him for this favor, he is compelled to answer, "No copies for distribution." He then applies to the member of Congress from his district, who, perhaps, not knowing his politics, thinks "it won't pay" to send one of "our documents" without knowing who is going it. Every inventor should enter his solemn protest against these abuses; and as the SCIENTIFIC AMERICAN is taken as his text-book and guide, I look upon it as the only proper place to commence the warfare. J. R. G.

Louisville, Ky., July 2, 1860.

[In reply to the above inquiry, we can only say that the remedy for the grievance complained of rests solely with Congress. A limited number of the reports are left with the Commissioner of Patents. His practice is to furnish a copy to each inventor who has obtained a patent during the year embraced in the report. Those which are left are distributed in such a way as is thought likely to best promote the general interest, giving a preference to libraries and other public institutions. The whole number of those who are each entitled to a copy of the reports, in accordance with this rule, is some five thousand annually. It will therefore be readily perceived that the Commissioner has a sufficient excuse for not being able to accommodate the large number of those who are constantly reqesting this favor. We have no doubt but a much better arrangement than that heretofore followed might be made by having a much greater proportion of these reports to be distributed by the Patent Office. This course has been long advocated by us. But perhaps it is too much to expect anything in the nature of such a self-denying ordinance from our legislators. The distribution of these documents furnishes a convenient method for them to confer favors which will at least be regarded as compliments by those who receive them, whether they ever read a page in them or not. The only remedy we can suggest, therefore, is to recommend to every inventor to try to elect such members of Congress as will use their privileges for the purposes for which they were intended, by distributing Patent Office reports to those would prize and use them, rather than by distributing them in payment of the services of political recruiting-officers, who make no more use of them than a horse would of a handsaw.—EDS.

QUICK WORK.—Some days ago the appearance of flour from new wheat in the Augusta (Ga.,) market was noticed. Its movements from the field to the channel of commerce are worthy of a record, showing that we of the South can be as fast as the Yankees, when we have a mind to. On Thursday morning that wheat was standing in the field, on the farm of Dr. Daniel, opposite this city. It was cut, thrashed and winnowed, and sacked on that day, brought to Savannah, and taken by the night train 130 miles, to Stovall's Excelsior Mills, at Augusta, where it arrived early on Friday morning. By two o'clock that day it was ground, the flour bolted, re-sacked, and on the cars for Savannah, arriving here by the 10 o'clock P. M. train, having undergone all these changes, and traveled 260 miles in less than 48 hours; but this is not all. Early next morning (Saturday) 20 sacks of it were on board the steamer, and will be in New York in time to be served up by the hotels at breakfast on Tuesday morning! We have thus five days for the whole operation, including some 1,100 miles of travel.—*Savannah Republican.*

A VARNISH FOR IRON-WORK.—To make a good black varnish for iron-work, take 8 lbs. of asphaltum and fuse it in an iron kettle, then add 2 gallons of boiled linseed oil, 1 lb. of litharge, ½ lb. of sulphate of zinc (add these slowly or it will fume over), and boil them for about three hours. Now, add 1½ lbs. of dark gum amber and boil for two hours longer, or until the mass will become quite thick when cool. After which it should be thinned with turpentine to the proper consistency.

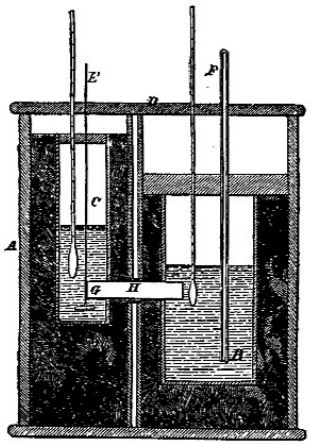
THE CONDUCTIBILITY OF METALS AND THEIR ALLOYS FOR HEAT.

Translated from Dingler's Polytechnic Journal, expressly for the Scientific American.

In order to be able to determine with exactness the conductibility of all common metals and of 70 of their alloys and 30 amalgams, it was necessary to fix upon a new method. The old method of Depretz could give authentic results only for a few of the very best conductors of heat, such as silver, gold and copper. With his method a long and thick bar of the metal is required in order to be able to drill holes in the same, large enough to receive some mercury and the globe of a thermometer, and it would have been necessary to procure a large quantity of each metal perfectly pure, which cannot easily be accomplished. Furthermore the fact that with his process mercury is used, makes it impossible to determine the conductibility of such important alloys as brass and bronze, and for the amalgams his method is not at all practicable.

Hitherto, the important question, whether the alloys are simple substances or chemical compositions, could not be solved, because they are generally prepared from impure metals, such as are commonly sold in the market, and not in the proper chemical proportion. And in this case the chemical compositions, which the metals endeavor to form, are mixed with a surplus of one or the other of the employed metals and the alloys therefore show properties which do not explain their nature. Furthermore, in many alloys, such as those of copper and tin, or copper and zinc, the metals have a tendency, on being cooled slowly, to form several crystalline compositions, the ingredients of which are mixed in different proportions, in the interior and in the exterior parts of the alloys, the interior parts containing the easy fusible portion, and the exterior parts the hard fusible portion of the alloy. Besides these difficulties, the compositions in the metals generally sold in the market are so considerable that thereby the qualities of the alloys are considerably modified, for we have found in our experiments that if 1 part of a metal is added to 99 parts of another metal, the conductibility of the latter is essentially altered. In order to avoid these difficulties, we have prepared our alloys with pure metals according to the law of definite proportions.

The apparatus which we used for determining the conductibility of the metals is represented in the accompanying engraving, and it consists of a box of pine-wood, A, about 4⅓ inches wide, 6½ inches long, and 8⅝



inches high. It is furnished with a cover, and painted white inside and outside. In this box are contained two square cases of vulcanized india-rubber, the sides of which are ¼ an inch thick. The largest of the two cases has a length of 2 inches at each side, it is 5½ inches high, and capable of containing 20 cubic inches of water. The smallest case has a length of one inch on each side, and a hight of five inches, and it is capable of containing 5 cubic inches.

These cases are painted white and surrounded by wadding in order to avoid all and every communication of heat from one case to the other, a pine board, is placed between them. The quantity of heat radiated from the largest case, B, is so small, that if the same contains 12 cubic inches of water, at 195° Fah., and the smallest case, C, 3 cubic inches at 60°, the temperature of the water in the last-named case does not rise 1-20th of a degree during the time required for our experiment. By these means all sensible radiation and transmission of heat is avoided, and the rise of the temperature taking place in the smallest case during the experiment is caused altogether by the heat transmitted through the prismatic metal bar, G, which forms the communication between the two cases. This bar is 3 inches long, and ¼ an inch wide, and it is so arranged during the experiment, that ½ an inch of its length is contained in the case, B, and ½ an inch in the case, C, one inch is surrounded by the side walls of the cases, through which it passes, and the remaining portion, marked H, in the engraving, is inclosed in a tube of vulcanized india-rubber; the whole is made water-tight by covering the sides of the holes through which the metal bar passes, with a varnish of india-rubber dissolved in benzine. The bar is at a distance of two inches from the bottom of the case, B, and ½ an inch from the bottom of the case, C.

If an experiment is to be made, the cases are placed in water, in order to equalize their temperature; after having been cleaned off carefully, they are placed into the wooden box and surrounded by wadding, and 2 cubic inches of water having the temperature of the room, are poured into the smallest case, C. Both cases are now covered up by covers of vulcanized india-rubber, and after the cases have been covered all over with wadding, the lid of the box is closed down. Through a hole in the case, C, a very sensible thermometer is introduced, and in another hole a rod, E, of whalebone is placed, furnished at is lower end with a small disk of vulcanized india-rubber for the purpose of stirring-up the water in the case during the experiment, whereby its temperature is equalized throughout. After the water in the case, C, has obtained a settled temperature (generally within one degree of the room), a thermometer is introduced into the case, B, and 12 cubic inches of boiling water are now poured into this case through the tube, F, and this quantity of water is kept at the boiling point, during the whole time of the experiment, by means of a small jet of steam which is introduced through the tube, F.

The temperature of the water in the case, B, is transmitted through the metal bar, G, to the water in the case, C, and the rise of the temperature of the water during 15 minutes, and the time in which the rise takes place, are now carefully marked, from 5 to 5 minutes. During this time the water in the case, C, is kept constantly in motion, and the temperature of the water in the case, B, is kept up to the same point by the small jet of steam.

The metal bars used for the purpose are obtained by casting, and they are filed down to the required dimensions. For mercury and natrium we could not use the same proceeding, and we used a thin case of sheet iron, the cross-section of which is exactly ¼ square inch, the same as that of the metal bars which are employed. This case is filled with mercury, and perfectly closed, and the conductibility of the case thus filled is determined in the manner above described. The conductibility of the case previous to its being filled with mercury was also determined, and by subtracting the latter from the conductibility of the case, when filled the conductibility of the mercury has been obtained.

[To be continued.]

OIL—FAT—WAX.

[Communicated to the Scientific American.]

Oils, fats, wax, all belong to the animal and vegetable kingdoms. Fats proper form about the twentieth of the weight of a healthy animal. Oil, fat, and wax are of analogous composition, though they differ in texture. Oils and fats are easily separated into two greasy bodies, one very liquid, the other quite solid; the liquid is termed *oleine*, the solid is called *stearine*. In winter olive oil partially congeals; the solid is the stearine, and the fluid is the oleine. The art of making hard candles consists in separating the solid stearine from the liquid oleine of fats. Castor oil contains little or no stearine, but palm oil is nearly all stearine; hence the former is useless to the candle maker, but the latter very valuable. Butter contains sixty parts of oleine and forty of stearine, in every hundred parts by weight; hence it is a good representative of what is denominated fat—that is a body of a texture between oleine (oil) and stearine (wax).

Nearly every kind of oil and every sort of animal fat differs in the relative proportion of stearine and oleine which they contain. The most beautiful specimen of stearine is spermaceti—the solid fat of the whale; and the most perfect example of oleine is that expressed from the pestachio nut.

The chemistry of oils, fats and waxes is of extraordinary interest; hence they have been subjects of special study by several philosophers. Cheveural, a French chemist, has distinguised himself in this particular, and it is all in consequence of his discoveries that we now have such excellent hard candles at a moderate price; and the day is not far distant when tallow will be as little known and remembered as its old companion, the tinder-box, is at present.

The making of fats and oils into soap is purely a chemical operation, but of immense domestic value. It is difficult to mention the chemistry of fats and oils without becoming involved in a discussion that would fill volumes; we cannot, however, pass unnoticed one of the proximate elements of fat and oil, called *glycerine*, a peculiar sweet principle—a sort of white sirup, which can be separated from oil and fat. No cosmetic has perhaps been so justly and generally employed as glycerine, which is obtained by steam distillation from fat or oil.

Oil has been used as food from the most remote period, as is evident by its frequent mention in the Scriptures:—"Cakes and oil—unleavened bread and oil—meat and oil—wine and oil—nothing in the house save a pot of oil." In Italy, the land of the olive tree, oil is there consumed as food even more extensively than butter is in this country. The Africans use the palm oil and various other kinds now first made known to us through Dr. Krapf's travels in the same manner. Plato, Fernelius, Dioscorides, and nearly all the ancient writers speak favorably of oil in a medicinal sense, observing that it renders the body "prompt and agile." Every kind of fat of animals bears with it the peculiar odor of the creature from whence it its derived; so also every kind of oil (and oils are as numerous as the plants of the earth) bears with it some peculiar characteristic smell or quality. Oil is justly considered as one of the most universally useful things in the whole world. How beautifully was this typified, when the dove, after the Deluge, returned to the ark, bearing in its beak an olive leaf!

SEPTIMUS PIESSE.

COMPENSATING PENDULUMS.

MESSRS. EDITORS:—Your illustration of a newly invented "compensating pendulum," published on page 96, Vol. II., of the SCIENTIFIC AMERICAN, reminded me of the circumstance that, many years ago, in England, my grandfather constructed a clock, the pendulum of which was rendered compensative by a very simple and ingenious contrivance, a description of which I will subjoin; merely premising that the clock to which I refer was one of the old-fashioned make—an eight-day clock, with a case some six or seven feet in hight, and a pendulum proportionably long.

"The pendulum rod consists of a strong brass bar, to the bottom of which the bob is secured in the usual way; another bar of the same metal, and of exactly the same dimensions, is secured to the back part of the clock case, and kept in a perpendicular position by one or more grooves, the bottom resting upon an immovable base. At the top of this bar is a projection, to which the pendulum is attached by two pieces of watch-spring which pass through a slit of brass just below, fastened to the back part of the case. There is an adjusting screw at the top of the pendulum, by which it can be regulated without stopping the clock. Now, it is evident, from the construction, that the expansion and contraction of this fixed bar and of the pendulum rod must be equal, and in contrary directions; for whatever be the expansion of the pendulum by heat, as the lower end of the bar rests upon a fixed point, it must necessarily expand upwards and raise the upper end of the pendulum in the same proportion that its length is increased, so that the distance of the point of suspension from the center of oscillation will always remain invariable."

The above description is transcribed from a brief memoir (in manuscript) of my grandfather, written by my father, who was much devoted to scientific and mechanical pursuits, and the originator of an invention which, should the Atlantic telegraph ever come into successful operation, may prove of much practical utility.

HENRY GILES.

Fonthill, C. W., June 30, 1860.

EXTENSIONS OF PATENTS BY CONGRESS.

We have long and uniformly opposed these extensions, not from unfriendliness to those who would be thereby benefited, but on account of the prejudice which thence results to others equally meritorious. An article published on page 277, Vol. II, of the SCIENTIFIC AMERICAN, in which the power of Congress to grant such extensions is questioned, having met with criticism from some of our cotemporaries, we have been induced to review the subject and shall now proceed to give the result of our mature reflection.

We do not deny that Congress has the full power to make such extensions, provided they be done *before* the patent expires. Nor do we question the right of the legislative power to revive an extinct patent, unless by so doing other interests which have sprung up in the meantime are thereby directly and injuriously affected. But we do hold that, after a patent has been enjoyed during the full length of time allowed by law—after the invention has become public property and rights have accrued founded on the faith that it is to remain so—to resurrect that patent in such a way as to overthrow those rights is not only unjust, but, as we believe, illegal. All the laws that have ever been passed or sought for on this subject, have been of this very character.

We are aware that Congress has positive power to "promote the progress of science and the useful arts by securing, for limited times, to authors and inventors the exclusive right to their respective writings and discoveries;" but in the same great instrument which gives this power there is just as positive a prohibition against the exercise of any power by which any citizen shall be deprived of "life, liberty or *property*, without due process of law." Congress cannot exercise its conceded powers in such a way as to violate this plain prohibition.

Now what is meant by the term "due process of law" in the prohibition just referred to? Are we to understand merely that life, liberty and property, are to be held sacred until taken away by some act of the Legislature? If so, a bill of attainder may deprive us of our lives, or an act of Congress may send us to the penitentiary for life without a trial. We certainly do not hold our lives, our liberty or our property, by such a tenure. "The general meaning of the clause is that no citizen shall be deprived of his life, his liberty or his property, except by the regular administration of the law of the land." (Shepard's Constitutional Text-book, 250.) No mere legislative sentence can ever deprive us of the one or the other.

Now, by the 18th section of the Act of 1836, it is provided that "no extension of a patent shall be granted after the expiration of the term for which it was originally issued." When, therefore, a patent which has been held by its owner during the term prescribed by law is brought to its final period without being extended, every one has a just right to conclude that the subject-matter thereof is public property and that it is to continue so *forever*; and he is justified in making his arrangements accordingly.

It may be said that the rule just referred-to is intended for the guidance of the Patent Office only. We reply that it is the general law of the land and ought to be relied upon as such. If Congress can change its own rules, this cannot be done arbitrarily and under all circumstances.

Thus, a statute of limitations is intended for the government of the action of courts of justice. The Legislature may change or repeal these statutes, either generally or in special cases, at its pleasure, so as to operate upon all cases where titles have not accrued or interests grown up under the law. But, suppose the law to declare that the title to real estate shall not be questioned after a peaceful possession of twenty-one years. Such a possession would render the title of the occupant complete and it could never be disturbed by any subsequent act of the Legislature.

Or, suppose the law to declare that land which had been used for a certain length of time as a highway should be held to have been forever dedicated to public use. The Legislature might undoubtedly change this law so as to affect all cases where that contingency had not happened, but never so as to disturb interests which had already become vested after the expiration of the time prescribed. It might perhaps surrender back any rights which had been acquired by the public, but could do nothing to impair, without compensation, any private rights that had grown up after the dedication had thus become complete.

The principle here involved is that, where interests have grown up under the protection of a general law, those interests become *property*, which is protected by those constitutional provisions which declare that no one shall be deprived of his property without due process of law. The same rule is clearly applicable in the cases we are now considering.

This right to protection against the subsequent injurious litigation of Congress in these cases is greatly fortified by another important fact. The 14th section of the Act of 1837 requires the Commissioner of Patents, in his annual report, to furnish a list of all patents which have become public property during the previous year. Such a list is incorporated every year in the Patent Office Report, which, by the authority of Congress, is published and, by tens of thousands, is scattered broadcast over the country.

Not satisfied, therefore, with merely declaring by law that, where a patent has expired without being extended it shall forever remain public property, Congress thus takes special pains to send out to all the world the precise knowledge of what has thus been made free to all. It says to every inventor, manufacturer and consumer: "Here is a list of inventions which you are at full liberty to use as freely as the air you breathe; they have heretofore been private property, but they shall never become so again, and for this the public faith is fully pledged." If any person invests his money in any property upon the faith thus pledged, can that property be taken away or rendered valueless by a mere act of Congress? Does not the free use of the thing so patented and made public become secured, and can it afterwards any more be granted out in a monopoly to one person than the raising of corn or the selling of salt?

Suppose, for instance, that, after an invention has become public property, a person was to establish a workshop and provide machinery for the express purpose of manufacturing the thing so invented. This he has been invited to do by the action of Congress itself. Can the pledge involved in that invitation and in the more express declaration of law be withdrawn, and the money thus invested be rendered valueless, by giving to another person the exclusive right to make, sell and use the very commodity which, at great expense, he has thus prepared himself to manufacture?

Or, suppose that, after a patent has been obtained, some other person makes a valuable improvement upon the thing so patented (which is a matter of the most common occurrence). The new patent will be subordinate to the original one and cannot be used without a license from the prior patentee. But when the previous patent expires without an extension, the subordinate patent becomes free from this incumbrance. Suppose, now, some person were to purchase an interest in this subordinate but now independent patent. Can Congress turn around and, by resurrecting the dead patent, impose an incumbrance upon this property, which will render it of little or no value? If so, cannot the law declare to the purchaser of a piece of unencumbered real estate: "You cannot enjoy this property unless you pay to some favorite of Congress such annual sum, for the period of seven years, as he shall demand?" Are not *all* kinds of property equal before the law? Has Congress the power to confiscate or encumber one kind of property more than another?

In a thousand different ways do the consequences of such an extension manifest themselves; and in so far as they have the effect of taking away a right that had become complete, do we deny the power of Congress to grant such an extension.

It is true that many acts of Congress are held to be valid which have the effect of benefiting one person at the expense of another. Thus the levying of duties on imported manufactures is regarded by many as giving money to Peter which is taken from Paul. We shall at present say nothing of the legality or propriety of such proceeding; but surely there is a manifest difference in principle between a law which *collaterally* affects one's property and one which takes it away *directly*. A law which indirectly renders A's property less valuable than it would otherwise have been, and makes B's property more so, is fundamentally different from one which says to A, "You shall not pursue your regular and honest business at all, unless you first pay to B such a sum as he may see proper to ask for the privilege."

We do not overlook the fact that the law permits machines to be patented which have been in public use for a period of not more than two years; nor that Judge Marshall, in the case of Evans *vs.* Jordan (1 Brock, 248), held that it was competent for Congress to extend that patent after it had expired. But that extension was made in 1808, before the enactment of the provision declaring that a patent should not be extended after it had expired, and before the occurrence of anything which caused all the world to be officially notified of that fact.

And, upon the same principle, can a patent be held valid which was granted a year or two after the subject-matter thereof had been in public use? Is there any reason why it should *not* be valid? No law has made it public property. There is no pledge of the public faith which has been violated. No person had acquired a property in the invention which had been thus in public use, and therefore the subsequent granting of the patent to the inventor took away no property in disregard of the constitutional prohibition.

But would an act of Congress be valid which should prohibit the owner of a field from raising corn therein, or the owner of a store from selling groceries or dry goods therein, unless he shall first pay some favorite of the government such sum as he shall see proper to ask by way of "blackmail?" If not, can it prevent the owner of a workshop from manufacturing any commodity the invention of which had legally become public property when such workshop was established and put in operation? If so, is one species of property as sacred in the eye of the law as another?

The foregoing reasons, among others, satisfy us fully that Congress cannot, by the extension of a patent, directly take away or diminish the value of property which has become vested subsequent to the expiration of the patent.

ELECTRIC TELEGRAPH WIRES.—A patent has lately been taken out by Mr. Clark, of London, for a peculiar manner of forming telegraphic wires, so as to make the current flow in the centre and prevent its dissipation by flowing off at the surface. He employs silver, which is the best conductor for the central wire, and on this is an outside casing of copper. The two metals are united by heating before they are wire drawn, so that strength is thus given to the best conductor. In employing the best conductor at the center of the compound wire, it will tend to centralize the current and prevent its dissipation in long circuits. The silver wire, it will be understood is melted in the inside of a hollow ingot of copper. This will be an expensive conductor, but there can be no doubts of its superior qualities to the common iron or copper telegraph wires.

GUN-COTTON AND CANNON.—The Austrian artillery has been making experiments with rifled cannon loaded with gun-cotton. Although the twist is very considerable, the pieces can be loaded at the muzzle. At the last account they had succeeded in throwing a six-pound ball three miles with six ounces of gun-cotton. These guns are very light, and this, with the small quantity of ammunition required, renders them particularly applicable to mountain warfare, especially as it is possible to fire for a considerable time before the enemy learn whence the shots are coming, since the gun-cotton makes no smoke.

GALVANIC BATTERIES.—Prof. M. Jacobi, of St. Petersburgh, Russia, has recently pointed out the advantages of substituting lead for platina in the application of secondary currants to the electric telegraph. M. Gaston Planté, who has made a special study of these currents, discovered that the inverse electromotive power furnished by electrodes of lead in acidulated water, is about six and a half times greater than that given by electrodes of ordinary platina. This electromotive power, although produced by plates of the same metal, is also very superior to those of the elements of Grove or Bunsen, in consequence of the great affinity of the peroxyd of lead for hydrogen—which has already been so ingeniously applied by De la Rive—in the voltaic cups.

THE *Moniteur Scientifique*, of Paris, publishes a short note by M. Golowkinsky, showing that when chlorobenzol, mixed with oil of naphtha, is acted upon by oxalate of silver, essence of bitter almonds is produced. If the naphtha is not present the mutual action of these two compounds is too violent, and they are entirely decomposed.

REFORM IN WEIGHTS AND MEASURES.

BY E. M. RICHARDS.

"Prove all things and hold fast to that which is good." This should be peculiarly the mission of this country; for, from the circumstances under which she sprung into existence—first as a colony and afterwards as an independent nation—she is happily freed from much of that unreasoning respect for antiquated notions and customs that presses with such *mind-crushing* power on the people of the Old World. Yet, even in this favored confederacy, there is a large portion of that conservatism which is stigmatized as "old fogyism," and to its existence must be attributed the fact that we still tolerate the abominable system (?) of weights and measures which we derived from England. We have to thank that country for much that is valuable in our "institutions," but not for the system alluded to. We should have banished such weights and measures from the Union, along with their venerable brethren "pounds, shillings and pence," and we should have adopted something more akin to the beautiful "dollar, cent and mill" currency of the country. None but those who have had practical experience in the matter can appreciate the saving of time and labor that is consequent on the use of the decimal system here, as compared with the cumbrous and awkward monetary arrangements in vogue in other countries; but we only derive a portion of the benefit that is fairly to be expected from our decimal coinage, as long as we adhere to the present objectionable weights and measures now in use throughout the country. Such a use of them in the present day is pretty much like tilling the ground with the old Norman implements of agriculture; they both belong to a bygone age, and as the latter have gradually been superseded by improved modern constructions, so their cotemporaries under consideration should only be known to the antiquary.

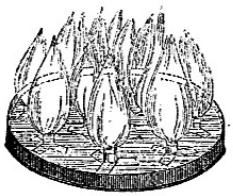
The measures now in common use (more or less modified) were originally taken from very imperfect standards. They came into existence when the whole world was in a state of ignorance; and, like the wretched orthography with which the English language is now afflicted, instead of being the offspring of scientific investigation, they appear to have been merely the make-shift creations of a barbarous people. Such an origin, however, was of course inevitable, for beginnings are always rude and imperfect; but it is not much to our credit that we have so long endured this state of things without endeavoring to devise a better. As illustrations of the "rule-of-thumb" method by which our weights and measures were originated, it may be stated that one Grain was, at first, actually a grain of wheat taken from the middle of the ear, well dried, then used as a weight and its name retained. Thirty-two of these were called one Pennyweight, from their weighing as much as the silver penny then in circulation. A weight equal to that of 20 of these pennyweights was designated one Ounce; the last word being derived from the Latin word *uncia*, and meaning the twelfth part, as 12 of these are equal to one Pound, just as the term Inch means also the twelfth part of one Foot. After a time, these subdivisions came to be changed somewhat, but the names have been handed down to us. The Barleycorn, formerly to be met with in long measure, had a similar origin, and the Yard was taken from the length of the *arm* of King Henry I., of England.

Now, if any of the readers of the SCIENTIFIC AMERICAN have sufficient time and patience to read through the tables of weights and measures published in the arithmetic books, they will be reminded of the wearying drudgery that the memorizing of such a budget of puzzling nonsense continually inflicted on them in their school-boy days, and they may perhaps feel some sympathy for the little ones who are now going through the same *mill*. While on this topic, it would be well to remind those that interest themselves in the progress of the young that, if the avenues to knowledge—spelling, reading, writing and arithmetic—were divested of the barbarisms that encumber them, the labors of both teachers and scholars would be far lighter. To save labor of all kinds, mental and corporeal (or, in other words, to perform the maximum of work with the minimum expenditure of force), is the great problem of our day. We recognize the correctness of the principle in some matters but not in others; for instance, it is quite right to make a given amount of coal evaporate as much water as possible, but it is quite wrong to substitute the scientific and beautiful method of phonetic representation for the confusing and contradictory orthography that we are now compelled to use, and that will compel the rising generation to spend years in learning to read and write, where months would be sufficient, if we could only bring ourselves to discard an alphabet that is utterly unable to do the duty imposed on it, and adopt one specially designed for the task. If it is bootless to hope for the "spelling reform," however, I trust it is not so as regards the reform in weights and measures. Will the SCIENTIFIC AMERICAN continue to urge its importance until some of our progressive members of Congress take hold of the matter, investigate its claims and give it a fair hearing? I have no fears for the result, if the matter is to be decided on its *merits*; not allowing the question of "vested interests" to have undue influence.

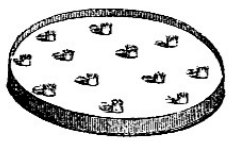
(To be continued.)

A NOVEL HOT-AIR BATH.

The London *Chemist and Druggist* describes the following simple contrivance (lately introduced by the great Prices' Candle Company) for giving an extemporaneous hot-air bath. It consists of a tin dish filled with the pure cocoa stearine, and having 12 short wicks supported in tubes, as shown in the cut, which represents it as supplied, and as lighted ready for use. It is employed as



follows:—The person taking the bath, having all clothing removed, should sit upon a cane-bottomed chair, upon which a towel has been folded. A blanket, placed over the back of the head, should fall over the shoulders and the two ends should be fastened in front. Another blanket should then be brought under the chin, the two ends passing over the shoulders, so that, with the exception of the face, the entire body and the chair are completely covered in to the ground. The air-heater is then lit and placed under the chair; and in the course of five minutes, the air is raised to 100° or 110° Fah.,



producing, according to the time of taking the bath, a more or less profuse perspiration. The editor of the above journal says "We have tested the invention, and find that it acts efficiently and pleasantly; the watery vapor produced by the combustion of the stearine producing an abundant perspiration. In those cases of illness where it is desirable to produce a copious action of the skin, it is really a valuable appliance; by its employment many a chill that would naturally result in a severe cold, or even fatal inflammation, may be cut short at its very commencement."

AGRICULTURAL SCIENCE—THE CATTLE DISEASE.

The *American Agriculturist* for June contains a most satisfactory letter on this subject, by Charles W. Bathgate, of Fordham, N. Y., a very experienced farmer. He states that pleuro-pneumonia or "cattle disease" is similar in some respects to what consumption is among human beings, and that it has been more or less prevalent among cattle in various parts of the country for the past 15 years. In former years several of his cattle as well as those of his neighbors had been attacked, and they rarely recovered after the disease had become seated. The method by which they were treated was by bleeding and administering physic. During the past winter a few cases of this disease having appeared among his herd, he adopted a different mode of treatment which has been entirely successful; every animal that was attacked having been restored to perfect health. As soon as an animal appeared diseased, it was separated from the others, and placed where it had plenty of fresh air, and was sheltered from cold storms and the hot sun. The diseased cattle were simply kept in a place where they had an abundance of pure air, that was maintained at a somewhat cool but uniform temperature. No medicine was given internally, but a first-rate diet, such as ground oats, and a very little good hay, or good pasture feed. A blister of Spanish flies applied over the region of the lungs was found to give relief as a counter-irritant. The hair was shaved off in two spots about the size of a man's hand, just back of the two fore-legs, not too high up the sides, and the blister salve was then rubbed on the skin. The sores were allowed to run for two days; then they were dressed with lard or sweet oil. This is certainly a simple and rational method of treatment, and the success which has attended it should recommend it to public favor. Mr. Bathgate believes that the breath of affected animals, either when standing in the stalls, or feeding in the pasture, may affect healthy cattle—that is, the disease is contagious under certain circumstances.

The following is the diagnosis or description of the symptoms of this disease as it exists in Massachusetts, and as represented to the Legislature by Messrs. E. F. Thayer, Verterinary surgeon, and George Botes, M.D:—"If the animals are at pasture at the commencement of the disease, they will be found, early in the morning, separated from the herd, with arched backs, hair rough, and refusing to eat; while, as the day advances, they will join the rest, and appear to be in usual health. A slight but husky cough will be occasionally recognized; and, at times, the breathing will be increased, as if the animal had made some extra exertion; and in milch cows there will also be a diminished amount of milk. As the disease progresses, the cough becomes more frequent and husky; the respiration is humid; the pulse increased and somewhat oppressed; the appetite diminished; rumination suspended; bowels constipated; surface of the body and limbs cold; the skin rigid and almost immovable over the ribs; the animal, upon pressure upon the spine, flinches, and is unable to bear pressure or percussion on the sides of the chest or costal regions (or ribs). In more advanced stages the respiration is difficult, labored, and painful. The animal frequently lies down; and when standing, the head is protruded, the mouth covered with frothy saliva, the muzzle cold, and the aspect spiritless and haggard."

MINING MACHINERY—A VOICE FROM EL DORADO.

MESSRS. EDITORS:—Your favor, with my Patent papers, came duly to hand. When they arrived I was absent in the mountains, fitting up the amalgamator at a large new mill; they use 20 of them, and get more than double the gold that they have been able to do with any other process or amalgamator. I thank you most sincerely for your kindness and promptness in obtaining the documents; and I have good reason, for I have made over $5,000 out of it already, and could sell the right for the State for over $40,000; but I intend that every owner of a quartz mill shall have one. I have over a 100 of them in use now, and they seem to be the favorite.

ISRAEL W. KNOX.

San Francisco, June 4, 1860.

[We publish the above to call the attention of inventors to the subject of improvements in mining machinery. We believe there is no one branch of business more susceptible of improvement in its operation than the important one of mining, and we shall expect to see great improvements in machinery for excavating, crushing, and amalgamating or dissolving the quartz. Inventors will do well to turn their attention to this subject. The patentee who writes the above letter admits he has done well with his invention.—EDS.

A HINT TO ADVERTISERS.—A South Carolinian correspondent appends the following sensible remarks to a recent letter addressed to us:—"*What's the price?* This is an inquiry upon every one's tongue; yet many men, who are wise enough to be regular advertisers, strangely neglect this most important part of an advertisement. The further the consumer is from the market, the more important it is that the prices should be named; especially is it necessary for such articles as are advertised in the SCIENTIFIC AMERICAN. I believe that, as a general thing, a list of prices is more attractive than a long *puff* of good qualities. Thousands of orders are annually lost for want of a ready answer to the above inquiry."

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

[Reported expressly for the Scientific American.]

On Thursday evening, June 28th, the usual weekly meeting of the Polytechnic Association was held at its room in the Cooper Institute, this city; Professor Mason presiding.

MISCELLANEOUS BUSINESS.

The Cork Tree.—Mr. S. V. Smith, of this city, exhibited the trunk of a cork sapling, and made some interesting remarks upon the peculiarities of the cork wood tree. The cork tree is a species of oak, grows to a large size, and lives to an age of one or two hundred years. Whht is known in commerce as cork is only the bark of the tree; the bark is stripped from the tree without any difficulty, and in about 10 years is replaced. The cork tree is abundant in the southern part of Europe. An ounce of good cork has buoyant power on water of one pound. The wood of the cork tree is hard and fibrous and resembles ordinary oak.

The Great Eastern.—Mr. James Montgomery, at considerable length, addressed the meeting in eulogy of the *Great Eastern*. He considered the *Great Eastern* the staunchest and safest vessel afloat, and that although, at present, some may look upon her as a commercial failure, she can be a failure in no other respect. When commerce can make use of large ships there will be no difficulty in their construction, and all the advantages predicted by science will be realized.

Strength of Tubes.—Mr. Fisher exhibited a sample of iron tubing used for boilers, which he considered quite too thin for that purpose. He invited mathematicians to elucidate the methods of determining the strength of materials in the form of tubes.

The President here introduced the regular subject—"Cut-offs."

DISCUSSION.

Mr. Rowell gave some further details of experiments late performed at the Metropolitan Mills, this city, tending to show that cut-offs are useless. He gave satisfactory answers to various questions as to circumstances of the experiments which he had omitted. For example, he stated that unusual precautions had been taken to prevent the error by loss of heat through radiation from the boiler, pipes and engine. He concluded his remarks with strictures on a pamphlet issued by the Corliss Manufacturing Company, to the purport that the Corliss Company claim for the cut-off only a regulating power.

Mr. Seely—So far in the discussion we have had only facts, and to some minds such facts as are stubborn and ultimate. But I submit that we should deal here with something beyond and above such crude things. There is nothing more uncertain than what are called facts, and no weaker foundation for reasoning than simple facts. Every absurd scheme is built up on facts, and facts endorsed by what we consider the highest testimony. No composition of matter given to sick people as medicine can be so inert or harmful that we may not have the unimpeached testimony of the most respectable clergymen, lawyers and statesmen, that they were cured by it of consumption, or rheumatism, or something else.

The President—How about chemists?

Mr. Seely—They sometimes tell one side of a story when they are handsomely paid for it. I have little respect for facts in a scientific argument. But we have something certain and sure in the laws of nature, and the principles of science which have endured the scrutiny of ages; these are immutable, and the facts which are irreconcilable with them are rubbish and chaff. Now, as to the cut-off: its utility, in my mind, cannot be brought in question, and the only feeling I have concerning the facts which are brought here is one of curiosity to find out where lurks their fallacy—to discover that omitted element which, when seen, will entirely change their nature. Steam does our work by virtue of its expansibility. Inclosed in the boiler, its power is in abeyance; when the port is opened to the cylinder, the piston gives way to this power. It is the expansion of the steam, and nothing else, which moves the piston. This power must be used against the piston, and exhausted against it, or it is lost. If the steam has any expanding power when it leaves the piston, so much is lost; it is power wasted on the air. The steam issuing at a 100 lbs. from a cylinder without a cut-off wastes nearly one-third of its available force. If you cut off at one half, the half cylinder full of steam has an average pressure of 75 lbs. for the remainder of the stroke. If you cut off sooner, the gain is greater.

The President—Would you recommend a cut-off where it was required to get the greatest amount of work from an engine in a given time?

Mr. Seely—Certainly not. But if an engine could not do a given work with a cut-off it should be replaced by a larger. As to economy of fuel, the condensing engine, when so built as to overcome the practical difficulties of friction and loss of heat by large surfaces, is the cheapest; and in engines of high pressure, there is no difference in economy, except such as is brought in by the differences in friction and cooling surfaces. The cut-off does not in any sense make or increase the power of steam; it only saves what would otherwise be lost.

Mr. Montgomery—There is much improvement needed in the construction and management of engines. There is no part of the whole apparatus that may not be a source of waste, or produce an error in a test experiment. The boiler at high pressure may leak and run into the fire, while heat may be lost by radiation from the boiler pipes and engine. The whole should be protected against such loss.

Mr. Rowell—In the experiments I have detailed, the boiler was blanketed and the pipes protected with felt. The whole was sheltered from currents of air.

Mr. Montgomery—Cut-offs are often used with steam at too low temperature, or cut off too soon. Cylinders should be protected by a jacket of superheated steam.

The President—Waste is often chargeable to the engine operatives. A railroad company once reduced the wages of engine-drivers, but promised them a share of any saving they might make for the company. The system worked well, for the workmen received more and the expense to the company was less than before.

Mr. Dibben—The experiments of Mr. Rowell do not at all weaken my confidence in the utility of the cut-off, but yet are of value. There are many things about the steam engine which are to be determined by just such experiments. The use of the cut-off requires a larger cylinder, and thus friction and loss of heat are a larger element. Mr. Isherwood does not disapprove the working of steam expansively under all circumstances, but only in certain cases.

At the close of the discussion, Lieutenant Bartlett moved an adjournment till the 1st of September. After remarks on the propriety of a vacation during the warm weather, it was agreed to further consider the subject in two weeks, to which time the meeting adjourned.

The subject of "Cut-offs" was ordered to be continued at the next meeting.

A PROFITABLE PATENT.—An ingenious and successful patentee (O. Coe, of Port Washington, Wis.) concludes a recent communication as follows:—"Allow me further to say that the patent I obtained through your branch office at Washington, for a rotary harrow, is proving to be a very good thing and is much liked by all who have used it. The times are very hard for selling patents or anything else; but I have succeeded in selling six of the western States, within the last nine months, for $9,000. I offer it low by States. Some purchasers of State rights are now selling counties at from $100 to $250 each. It is a capital thing for fitting ground for a crop and also for covering in large seed, such as barley, peas, &c., and also winter wheat. I have sent several applications from Wisconsin to your branch office at Washington, for others, this year."

REFORM IN WEIGHTS AND MEASURES.—On another page of the present number will be found the first of a series of able articles on this important subject. We cordially endorse the author's views, which are the same as those we have often urged in former years through the columns of this journal, and which we very fully discussed on page 52 of our last volume. If *the press* throughout the country, would occasionally devote a little space to the ardent advocacy of this great reform, it would soon be adopted. The SCIENTIFIC AMERICAN has "set the ball rolling;" who will next strike it?

TUBES made of paper charged with bitumen have been used for water pipes in France, and they have been subjected to a pressure of 250 pounds on the square inch, without bursting. Small pipes, made of this same material, about half an inch in thickness, have also been successfully employed in Paris for conveying gas.

A COLUMN OF VARIETIES.

The Winans steamer has been undergoing further alterations, which are said to be decided improvements. She made a successful trial trip on the 23d ult.

Mr. John Dudley, for many years one of the head workmen at the Washington Arsenal, has been appointed by the government to go to Japan with the returning embassy, and superintend putting-up the various articles of machinery presented by the United States and her citizens.

An immense bed of white marble, said to be equal to the finest Italian, has been discovered in Presqu'-Isle county, Michigan.

It is stated by some of our foreign cotemporaries that M. Toussaint, of Paris, has made the discovery of taking and fixing the natural colors on photographic pictures. The principal substances which are said to be used by him are oil of pink and chloride of gold. We receive this information from abroad with many doubts of its correctness, but hope it may be true.

Rodriguez Masta, a young man of Toledo, Spain, has recently finished copying upon a single sheet of paper of about the ordinary letter size, in legible characters and without abbreviations, the whole of Don Quixote. He employed two years, and nearly lost his eye-sight, in the useless task.

The Springfield *Republican*: states "A mechanic has lately made an improvement in arranging railroad car wheels and axles, to insure greater safety and prevent the wheels running off the track in turning curves. The arrangement is stated to consist in having the wheels loose instead of fixed on the axles, as they now are." There is nothing new in such an arrangement of car wheels and axles. It was proposed and tried several years ago, but without any good results attending it.

Galignani's Messenger, of Paris, recently gave an account of a discovery made by a French lady, for curing chronic deafness, by simply introducing a few drops of ether into the ear, three or four times in succession. A great number of persons are stated to have been cured by this application. Great caution is necessary in making applications of this character to such a delicate organ as the human ear.

Many of the heavy freight trains carrying coals on the Great Northern Railway (England), run at the rate of 40 miles per hour—a higher speed than that of our express trains. Larger engines are now being built, it is stated, in England, so as to run at the rate of 50 miles per hour.

The London *Engineer* states that experience has demonstrated the narrow to be preferable to the broad gage for railways. The power required to work it is much less; broad gage roads requiring engines and carriages of excessive weight. The broad gage necessitates longer axles, which increase the liability of one wheel to run ahead of the other in turning curves.

A mechanic in Islington (England) has recently made a burning-glass, three feet in diameter, by which steel, flint, and even platina, it is said, have been melted by concentrating the rays of the sun upon them. Owing to its great size, it has attracted the notice of several societies devoted to science and art.

No art, excepting that of photography, has progressed and improved so rapidly as that of dentistry. Forty years ago it was not a distinct profession, for all doctors then officiated as regular tooth-pullers, with turnkey levers of the most rude description; and as for supplying the place of old teeth with new ones, it was never done at all. In 1820 there were only 30 practicing dentists in the United States; in 1850 there were 2,923: at present there are about 5,000. The invention of artificial teeth has given a wonderful impetus to this most useful and beneficial art.

In a letter of Dr. Hassal to the London *Lancet*, he states that poisoning with lead is more common than most persons suspect. He says: "The whole subject of lead poisoning is one of the greatest imporance, and it behooves the public to be thoroughly on its guard against this source of danger to health. For the employment of leaden vessels and pipes, in nine cases out of ten, no absolute necessity whatever exists, and in certain cases they ought, for the better protection of the public health, to be entirely prohibited. From the number of samples of water which I have received, containing lead, I am induced to believe that the metal is more frequently introduced into the system in this way than is expected.'

IMPROVED RAILROAD CAR BRAKE.

The office of a railroad brake is of a two-fold character, viz.: stopping a train suddenly in cases of emergency, and also reducing the speed of a train to make the regular stops at the stations. The great problem involved in the practical operation of brakes is to stop a train quickly without jarring the cars or sliding the wheels. To accomplish these results, the brakes of each car must act with a constant adaptation to the weight, being aided by brakes on the locomotives under control of the engineer, that no time may be lost in their application in cases of urgent necessity. The loss of but half a minute in applying the power of a brake, when a train is running at the rate of 30 miles per hour, is equivalent to the loss of half a mile in stopping the train; in which space dreadful dangers may be concentrated. The accompanying illustrations represent an invention in railroad car brakes, which embraces the features of throwing all the brakes of a train into action automatically, by the engineer simply arresting the speed of the locomotive, whereby he thus exercises complete and instantaneous control over all the cars; and yet the brakes are also set for proper action by simply putting the train in forward motion.

Fig. 1 is a side view of a car truck and bunter, and a portion of the car body; Fig. 2 is a perspective of the back end of levers; and Fig. 3 is a bottom view of the brake. Fig. 1 is shown as though the truck was divided longitudinally near the center.

The truck-trame, A, brake-heads, B B′, shoes, C C′, and the bunter, D, are all constructed in the usual manner. The king-bolt, E, passes through a slot in the draw-bar, F, as shown; therefore the bunter has a sliding motion of about four inches. V V are pendants which support the bunter, and allow it to slide longitudinally. The brake lever, G, Fig. 1, is pivoted to the draw-bar.

The box, Fig. 1, which holds the link that connects the brake-shoes, C′, to the truck-frame, has an oblong eye, as shown. This allows the shoes, C′, brake-head, B′, and the staple, Z, which passes through the center of the brake-head, to rise and fall one or two inches. The rod, L, passes through the center of the other brake-head, and is pivoted to the lower end of brake lever, G, and the flat rods, M N, are pivoted to the brake lever—one above and the other below rod, L. These are provided with hooks, *o o′*, one or the other of which is connected with the staple, Z. These hooked rods are connected with pendant, I, Fig. 1, so as to move longitudinally, and so as to be conveniently detached from it for the purposes of adjustment. This pendant is bolted to the center of the cross timber, A, of the truck frame.

Lever, J, Fig. 3, is fulcrated on the arm, T, which is bolted to the under side of the cross timber of the car body. This lever is pivoted to the draw-bar, F, and is employed in connection with the chain and hand-wheel, K, to operate the brakes by hand; likewise, in connection with a spring, to obstruct the sliding of the bunter sufficiently to prevent the brake from acting when steam is shut off. The spring is attached to the side timber, R, of the car body.

The brakes of the train are adjusted in the following manner:—The brake of the forward truck of each car, or that nearest to the locomotive, must have the hook, *o*, of its upper rod, M, placed below, and the hook, *o′*, of the lower rod, N, placed above the staple, Z. The brakes of the rear truck of each car are arranged reversely, because the bunters at the opposite ends of the car act in opposite directions.

The operation is as follows:—The staple, Z, Fig. 1, is shown in connection with the lower hook, *o*; and therefore, when the bunter is drawn forward in the act of starting, the upper end of brake lever, G, moves with it, and rod, M, is drawn in the same direction; and by means of its connection with staple, Z, draws the brake-shoes up to the wheels, and as the wheels begin to rotate in the direction of the arrows, the shoes, C′, by means of their adhesion to the wheels, are thrown up. The staple, Z, passes from the lower hook on to the upper, and the brakes are liberated. Now, if the speed of the locomotive is checked, the bunter is forced back by the momentum of the car, whereby rod, N, is drawn in the direction of arrow, 1; and as staple, Z, is now connected with rod, N, the brakes are put on and the train stops. If the locomotive is again started forward, the bunter is drawn out and the brake is taken off. In starting backward, the adhesion of the shoes to the wheels (which latter now revolve in a direction opposite to the arrows) will unhook, liberate and reverse the brakes as before. The train is now running backward, and staple, Z, is again in connection with rod, M; therefore, if the speed of the engine is again checked so as to resist the momentum of the train, the bunters are drawn out and the brakes are again put on.

By these means the brakes are under the perfect control of the engineer, as he can back his train and put on or take off the car brakes both when running forward and when running back, and he can also graduate their power as he pleases.

It will also be observed that these buffer brakes are also provided with the usual arrangement for operating each car by hand in the usual manner as well as having them under the complete control of the engineer, as they should be. Many dreadful collisions would have been prevented had the engineer been able to apply all the brakes simultaneously, more especially by the application of a steam-brake to the engine, which would be very suitable with an automatic brake of this character.

In reading the foregoing description of the action of this brake, it will be observed that the momentum of the cars is employed in operating the brakes of a train. If a car is retarded less than the one before it the pressure will be forward, and this will increase the power of its brakes; while if it is retarded more, it will hold back so as to slack the brakes, and maintain a uniform action on the entire train, however long or short it may be. The momentum will act upon the rear cars with nearly the same power as upon the forward ones. Every railroad company should employ the most efficient brakes, so as to meet every exigency; and when this is not done, a culpable and unwise policy prevails.

A patent for this invention was granted July 19, 1859, to Mr. William Perkins, of Plympton, Mass., from whom further information may be obtained.

Fig. 1

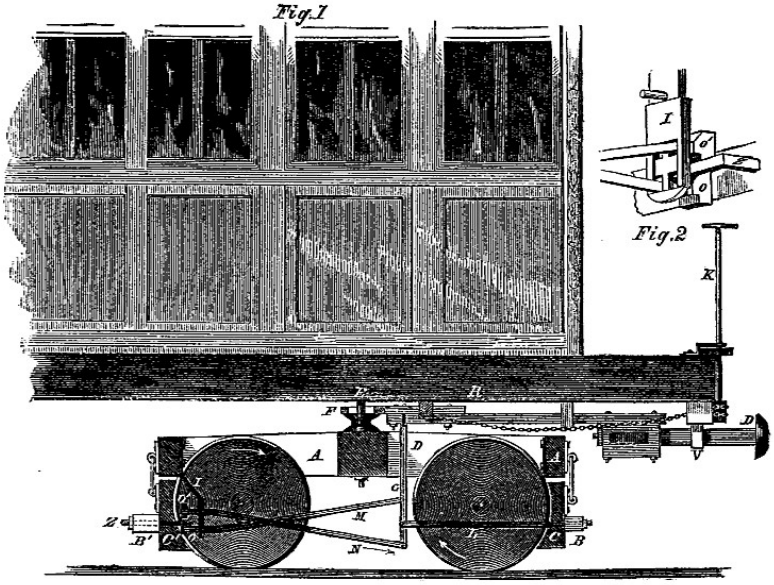
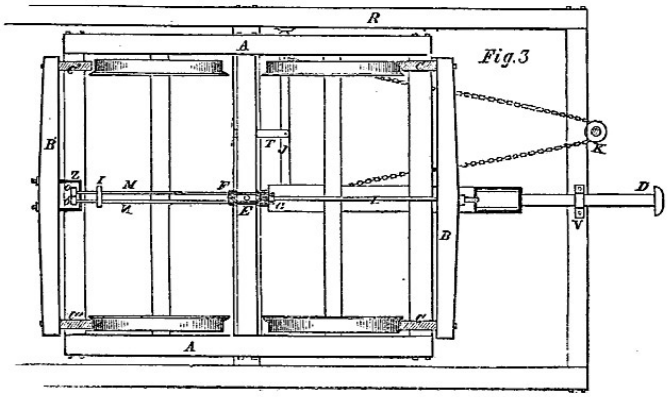


Fig. 2

Fig. 3



PERKINS' RAILROAD CAR BRAKE.

NEW PREPARATION FOR RENDERING TEPTILE FABRICS FIREPROOF.—Great importance is now attached to the rendering of textile fabrics fireproof, and a patent has lately been taken out in London for a new compound salt for effecting this object. It is prepared as follows:—Common sulphate of ammonia is placed in a reverberatory furnace raised to a red heat, and kept at this temperature for two hours. It is now withdrawn and allowed to cool. About 50 lbs. of this are now mixed with 200 lbs. of common salt, and 200 lbs. of the acetate of lime are dissolved in water heated to 140°, in a boiler. The water is now raised to the boiling point, and maintained at that heat until the moisture is driven off and a crystalline deposit remains behind. This deposit is now submitted to a red heat in a reverberatory furnace, and stirred well for half an hour, when it is withdrawn and cooled. This forms a salt which, when mixed with common starch and a little liquid ammonia, renders cotton and linen fabrics uninflammable. Such an application should be made to all the outside inflammable clothing of children.

MACHINE-MADE NAILS.—The ingenious Jacob Perkins (the inventor of the steam gun) and Jonathan Ellis, of Massachusetts, erected the first machinery for cutting and heading nails at one operation. In 1792, cut nails were first made in England by machinery; two rollers with dies being employed for the purpose. One-half the impress was made in each roller where they came in contact, the blanks were fed in at the top, and the finished nails dropped out below as the steel rollers revolved.

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VOL. III., No. 3.....[NEW SERIES.]....*Sixteenth Year.*

NEW YORK, SATURDAY, JULY 14, 1860.

THE NEW ATLANTIC TELEGRAPH.

NOW, since the *Great Eastern* is safely moored in New York harbor, our hopes are once more revived about the establishment of an ocean telegraph line between Europe and America. As neither the great mistake committed at launching the mammoth steamer, the explosion that took place on board, nor the quarrels of its stockholders have prevented her final triumph, it is not altogether impossible that the long silent Atlantic Cable, under the redoubtable galvanic volubility of M. De Santy, may yet be made to speak. Steamships are very well in their way, but the present *times* demand more rapid communication between the Old World and the New. We are impatient of tarrying from ten to eleven days for the latest news by the swiftest steam clippers; and as we can telegraph 3,000 miles in a few seconds, an Atlantic telegraph line must and *will* be established, not many years hence. It is just as easy to telegraph across the ocean as to communicate electrically between New York and Newfoundland. All that we want to do this are well-known agencies applied in the best manner. As the resistance to an electric current is inversely as the mass of the conductor, the larger we make the cable, the easier will it be to send messages by it; a cable of twice the diameter of the one that has been laid would offer only one-fourth of the resistance presented by the original. From this law it is easy to arrive at the conclusion that, with a suitably enlarged cable, submarine ocean telegraphing is quite practicable, especially if the cable is so made that electricity of *quantity*, instead of intensity, can be employed to operate the instruments; because the evils of inductive resistance would thereby be obviated. There has been some talk, recently, of again trying the old cable, by taking up the present "shore ends" and putting down larger ones; but no permanent success can ever be achieved on this route without a new and much larger cable. And when we remember the many failures that took place in laying the late one, it will be seen that quite different agencies are necessary for one of more massive proportions. It is not impossible, however, to obtain them; indeed the main one is at hand, namely, a suitable vessel. The *Great Eastern* appears to have been designed for just such a splendid operation. It has been stated that she moved among the ocean billows without experiencing any of those violent oscillations which rendered the running-out of the cable so hazardous with those two "little boats"—the *Niagara* and *Agamemnon*. This huge steamer is capable of carrying and laying a massive and appropriate ocean cable, and it would be in vain to try any other mode for accomplishing such an object by the old route—from Newfoundland to Ireland.

There are no indications, at present, of the above-suggested project being attempted; still, there is plenty of "sea-room," and we are pleased to learn that a new company is "sailing on another tack," and with good prospects of making a successful voyage. This is the "North Atlantic Telegraph Company," the projector of which is Col. Tal. P. Shaffner, of Kentucky, who has been in Europe during the past year, organizing measures for the undertaking. His object is to lay a telegraph line by means of short cables and way-stations on land in the northern regions. The route for the first length is from the North of Scotland to the Faroe Islands, with a cable 250 miles long; the next cable is to be 350 miles, to reach Iceland; the third, about 550 miles to Greenland; and the last about 600 miles, to reach the coast of Labrador in America—thence down through Canada. The aggregate length of this submarine line would be 1,750 miles; the land lines 300 miles, or a total of 2,050, the same length as the old Atlantic cable. These short cables can easily be laid, and operated for a certainty, because there are some larger marine lines than these in successful operation in Europe. What then are the objections to this route—to the North Atlantic Telegraph? None whatever; all persons should wish it success, and it affords us pleasure to state that favorable measures are in progress for carrying out the enterprise. In the month of May last, a deputation (among whom were the Right Hon. Milner Gibson, M.P.; Sir J. Duke, M.P.; Mr. T. W. Russell, M.P.; Mr. H. Pease, M.P.; Mr. J. A. Roebuck, M.P.; Hon. Sydney Smith, Postmaster-general of Canada; Captain Sir Edward Belcher, R.N.; Captain Collinson, R.N.; Captain Robinson, R.N.; Dr. Rae, Colonel Shaffner, Captain Young, Mr. J. R. Croskey, Dr. N. Shaw, Mr. C. Bischoff, Mr. J. Howard, Mr. J. Arrowsmith, Mr. J. Barrow, Mr. L. S. Magnus, Mr. W. Bevan, Mr. E. Wakefield, Mr. M. H. Chaytor, Mr. C. E. Deacon, and Mr. J. S. O'Beirne) waited upon Lord Palmerston to lay before him the plans for this new ocean telegraph line, and to solicit the British government to dispatch vessels for making soundings and otherwise surveying the facilities afforded by this route. The deputation was received with every mark of respect and favor, and Col. Shaffner explained the whole to the premier in a very able and satisfactory manner. The result of this is, that Col. Shaffner has conveyed to us the information that the British government has furnished a surveying ship, and he was to sail with it for Iceland and Greenland in the early part of this month. He also assures us that as much will be done by government patronage, for the North Atlantic Telegraph as was done for the old line; Captain Young, who accompanied Captain McClintock in his search for Sir John Franklin, has stated that the northern route is quite practicable, and he is well acquainted with the Arctic seas; and so we conclude that matters are progressing favorably for a new Atlantic telegraph.

THE DEATH OF CHARLES GOODYEAR.

"I know well that it is written in the Book of Genesis that God created all things in six days and that he rested on the seventh; but for all that, God did not create these things to leave them idle; therefore each performs its duty according to the commandment it received from God."—BERNARD PALISSY.

We are called upon to chronicle the decease, during the past week, of a man whose genius, whose patient labor, whose trials and privations have placed him foremost in the list of American inventors. Mr. Charles Goodyear died in this city on the 1st instant, after a protracted illness. The name of this great inventor has been familiar to the public for many years; yet few out of the circle of his immediate friends have known the story of a life so full of the strangest vicissitudes, ennobled by such a self sacrificing and never-tiring devotion to one object, but saddened by so many sorrows that it sounds like a romance as well as a reality. He lived, indeed, to see his bright dreams realized; he lived to see the almost worthless gum with which the savages of Central Africa smeared their bodies as a protection from insects, become a staple of commerce, employing for its transport ships in every sea, giving employment to thousands of workmen and millions of capital, and entering into the arts, the sciences, the daily uses, and the mechanical industry of the highest civilized life. The man who accomplished all this has not lived without purpose or in vain. Yet it is impossible to give any complete idea of the price which was paid for these great results—the long toil, the suffering so cheerfully endured, the privations which none but a son of genius, living on his dreams could have borne, the failures, the disappointments, the mortification and the success which came at last so late that it was no longer worth wishing for.

The most striking point in Mr. Goodyear's character was his sunny and cheerful disposition. He lived a life of constant struggle, he was involved in long and painful lawsuits with those who pirated his inventions, he was necessarily brought in collision with many who were connected with him or opposed to him in business; many lost money by the connection; but such was the impression made by this simple-minded and enthusiastic dreamer that, at the hour of his death, he had no enemy living. His generosity, his animated and affectionate nature, his earnestness and enthusiasm made him friends everywhere, and he was fortunate, far beyond the usual lot of men, in exciting neither hatred or envy or malice.

We presume that the story of this eventful life will be made public in some more formal mode by the friends of his family, and we will not attempt to fully trace the progress of his inventions. It was in 1834 that Mr. Goodyear turned his attention to the manufacture of india-rubber. There was a mystery about this tropical gum which gave it a strange charm in his imagination. It was not an article of commerce, but appeared from time to time only as a rare curiosity brought from foreign lands. The savages who possessed it kept the mode of its manufacture a profound secret. It was found only under the burning sun of the equator, in the gloomy swamps of the unexplored Amazon or the jungles of Asia and Africa. Its nature was as mysterious as its origin, the chemists who examined it were baffled in their attempts to make it of practical use. Ingenious men, abroad and at home, had attempted to solve the mystery, but all had failed. That it was of immense value in the arts, to supply a thousand wants of civilized life, was obvious to all, but the elastic gum kept its own mysterious secret and there was no clue to the discovery.

To discover the secret and solve the problem became the dream of Charles Goodyear's life. The difficulties and failures which he encountered only made it more dear to him. He asked aid from men-of-science, but they discouraged him; his associates abandoned the pursuit in despair; his friends one after another left him, but he only clung the closer to his cherished faith. In one of the contests by which pirates of his invention sought to rob him of his rights, the veil was half withdrawn from the life of the inventor, and a few details of the privations which he endured were given. He was in such extreme penury that his bed was sold from under him; he was so poor that it was said he could not buy an ounce of tea on credit. In the dead of winter there was no food in his house and no fuel for fire. This was not the struggle of a few months only, but it was the story of years, for it was not till 1844, after ten years of toil, that he perfected and patented his discovery. His labor, however, did not cease, and even to the hour of his death he was devoted to the favorite pursuit upon which he lavished the immense sums which he received from his patents. His life was subject to the strangest vicissitudes. He went from a poor debtors' prison to a palace in Paris. The man who was an object of cold contempt in an obscure village, on account of his poverty, received the Grand Cross of the Legion of Honor from the Emperor Napoleon as a reward of his genius. In Europe as well as America his name was honored and his merits appreciated, but to the hour of his death he was the same enthusiastic and patient inventor. We have placed at the head of this article a beautiful sentence of Palissy, the potter, which should be the motto for every true inventor. Charles Goodyear has been well called the American Palissy, and to his last hour he acted on the principle that God did not create him to leave him idle.

THE "GREAT EASTERN" OPEN TO THE PUBLIC.

On Tuesday, last week, the noble steamship was opened to public inspection at the modest charge of *only* One Dollar per head. The directors, in our opinion, have made a great mistake in charging such an exorbitant admission-fee. We consider it a very unwise exaction; because the majority of our practical mechanics and the mass of our working people—the very persons who are most anxious to visit her—cannot afford to pay so much for the privilege. One dollar is quite a large amount to be taken from their moderate incomes; and hence, where ten thousand would visit her if the charge were only twenty-five cents (which we deem sufficient), not five hundred can or will pay one dollar. We would recommend the directors to change their programme of admission, and charge one dollar only on certain days—say two per week—and twenty-five cents during the other four. We venture to assert, positively, that more money will be made by such an arrangement, and more general satisfaction will be given to the people, than by pursuing the present course. There are many persons

who would rather pay one dollar than twenty-five cents, so as to view the whole vessel in quietness, without being crowded; but the mass of the people cannot do it; the above-proposed adjustment of charges, therefore, would accommodate all parties and none would have cause of complaint.

The *Great Eastern* lies at the foot of Hammond-street, North river. Strangers who come to visit her should take the Eighth-avenue cars from the lower part of the city, or the Ninth-avenue cars from Canal-street. On approaching this vessel at her dock, her great size effects the mind with surprise and wonder. She is a floating mountain of iron, and no work of ancient or modern times can be compared to her, for exhibiting the ingenuity and power of man over the elements of nature. The scene from her lofty deck is grand and exhilerating. About fifteen hundred persons have daily visited her since she was opened, but more may yet be expected. Her paddle wheel engines are the chief objects of attraction; they are splendid specimens of engineering skill and ingenuity. The screw engines are *squat*, and make but an indifferent show, but they are also good examples of mechanism. The engineers have been enthusiastic in their praises to us, regarding the ease with which the engines can be handled.

The bottom of the *Great Eastern* is somewhat foul with adhering sea-weed and barnacles; and but for this, it is said she would have sailed about two knots per hour faster, in which case she would have made the passage across the Atlantic Ocean in less than ten days. A French inventor made several experiments with a machine to clean her bottom while lying at Southampton, but he did little or no good whatever. It has been proposed to take her upon two of our large sectional docks joined end to end, and we think this could be effected. It is not merely cleaning but also painting that she requires below the water-line, and for this purpose she must be raised "high and dry." A large dock, capable of holding her, is now building at Birkenhead, England, and it is expected it will be ready soon after she returns. It is not yet decided how long she will remain here; we will give notice of this to our readers in due season.

THE RIGHTS OF JOINT PATENTEES.

We are often inquired of, in relation to the rights of joint patentees or joint assignees as amongst themselves. This is a question which is attended with no little difficulty, and for which it is impossible to give a satisfactory and complete solution. We shall endeavor, at least, to throw some light upon the subject.

When several persons respectively hold joint fractional interests in an entire patent, either as patentees or assignees, or partly of each of those classes, in what capacity do they hold those interests? Not as patentees, unless by some special agreement to do so. They cannot be made responsible for each other's acts. They cannot claim to act for each other. They cannot be compelled to act together for any purpose. Their interests are held in severalty. Their relations towards each other are analogous to those of tenants in common of real estate. Each may use the common property. Neither of them can prevent his co-proprietors from doing the same. (See Hindmarch on Patents, 68.)

Where there is no rule of reason or of law to the contrary, a person may confer upon another the right of doing whatever he might do by himself. In other words, as a general rule, he may alienate any interest he himself possesses. An owner of a fractional interest in a patent may therefore not only make, use and sell the thing patented, himself, but he may give a license to another person to do the same thing. Whether he may carry this privilege to any extent he pleases, and, if not, how he is to be restrained from going too far, are questions we shall not attempt to answer at present. We are only dealing now with the general rule and shall not discuss the exceptions.

But as no one of the joint owners can exclude his co-owners from the rights held under the patent, so neither can he grant an exclusive right to another person; as that would infringe upon the rights of his co-owners and would be effecting indirectly what he could not do directly.

But an exclusive grant of that nature would not be wholly void. It would only be so in those particulars in which the powers of the grantor had been exceeded. The grantee would not be liable to prosecution as an infringer, but he could not prevent the other co-proprietors of the patent, or their assignees or licensees, from making, using, or vending to others to be used, the thing which was the subject-matter of the patent.

Another question sometimes asked is as to the rights and remedies of the several proprietors of a patent in cases of infringement by third persons. It was held in the case of Whittemore *vs.* Cutter (1 Gallison, 429, 431) that an action for infringement may be maintained by all the parties, who, at the time of the infringement, are the holders of the whole title and interest. But suppose some of them should refuse to join in such an action, how are the others to obtain a remedy?

We cannot find that this question has even been judicially settled. In Hindmarch on Patents (252) it is stated that "it has never been decided whether one of several patentees, or an assignee of a portion of a patent privilege, can sue alone for the damages which he has sustained by the infringement of the patent. There does not seem to be any good reason why such a part-proprietor should not be able to sue alone, although the language of the court of King's Bench, in a somewhat similar case (Weller *vs.* Baker, 2 Wilson, 423) seems to be an authority to the contrary." It appears somewhat singular that questions of this nature should not long since have been fully settled by the courts, not only of Great Britain but also of this country. Such, however, we believe to be the fact.

It was decided by the Supreme Court of the United States, in the case of Tyler and others *vs.* Tuel (6 Cranch, 324), that an assignee of a part of a patent right cannot maintain an action on the case for a violation of the patent, but this referred to a case where the fractional interest was determined by geographical lines. The assignee had not a fractional interest in the whole United States, but an entire interest in a portion of the United States, which has elsewhere been held to make an essential difference. The rule as to the disability of a grantee of an exclusive right in a fractional portion of the United States to bring suit is now changed (see Act of 1836, 314, and Wilson *vs.* Rousseau, 4 Howard, 686); but for the reason above given this has nothing to do with the question we have been considering.

It will be readily perceived that there are many difficult and perplexing questions which may grow out of the relation of the joint proprietorship in this kind of property, all of which require great caution on the part of those who are about entering into such relations.

JONES' BURNER FOR COAL-OIL LAMPS.

The accompanying illustrations represent an improvement in the burners of coal-oil lamps, for which a patent was granted to Edward F. Jones, of Boston, Mass., May 4, 1858, and it is believed that many persons are infringing it without being really aware of their liability.

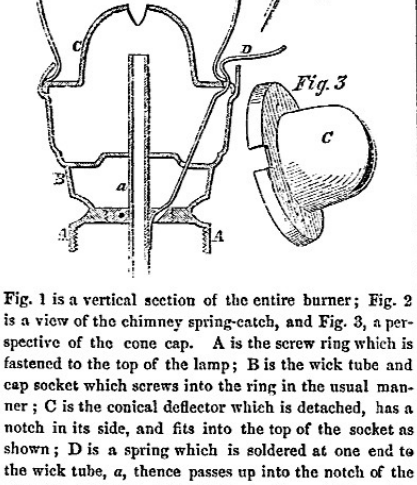

Fig. 1 is a vertical section of the entire burner; Fig. 2 is a view of the chimney spring-catch, and Fig. 3, a perspective of the cone cap. A is the screw ring which is fastened to the top of the lamp; B is the wick tube and cap socket which screws into the ring in the usual manner; C is the conical deflector which is detached, has a notch in its side, and fits into the top of the socket as shown; D is a spring which is soldered at one end to the wick tube, *a*, thence passes up into the notch of the detached deflector and holds in in place. This spring also holds the chimney, E, in position, so that it fullfils two offices, and a screw is not required for the purpose. The upper sides of the socket, B, and the bottom of the deflector cap, C, are perforated in the usual manner, for the air to pass through and upwards to supply the flame with oxygen. These devices and their combinations will be perfectly understood from the description given. The improvement affords a more convenient and simple arrangement than the common screw fastening for the chimney and fixed deflector.

The patent embraces two claims. It was first issued May 4, 1858, and the claims appeared on page 282 Vol. XIII (old series) SCIENTIFIC AMERICAN; then re-issued Jan. 11, 1859, and published on page 159, Vol. XIV of the same journal.

More information may be obtained by letter addressed to E. F. Jones, Nos. 35 and 37 Central-street, Boston, Mass.

RECENT AMERICAN INVENTIONS.

SAWING MACHINE.

This invention is an improvement in machinery for sawing out and tonguing and grooving stuff for packing boxes. It consists in the employment of a vibrating circular saw-frame, that is controlled by the operator, with a feed pressure roller for the purpose of feeding the stuff along until it abuts against a gage head, when the feed action is stopped, and the saw in the frame brought up so as to cut the board into pieces of any desirable length to be determined by the gage head; the saw and feed roller are operated by belts that receive motion from a common shaft, so that neither the motion of the saw nor that of the feed roller will be stopped while the main shaft is in motion. Combined with the table upon which the stuff is sawed up in lengths is arranged a movable gage board for jointing or cutting the boards that have passed through the first operation, to any desirable width in circles, and also a tonguing and grooving cutter, so that the three operations may be performed on one and the same table. The credit of this contrivance is due to Timothy Drake, of Windsor, Conn. Ill.

COTTON BALE TIE.

The demand for non-combustible metal hoops in place of combustible rope to bind cotton bales, having of late become very great, numerous devices for locking the hoops have been contrived. The one now before us is certainly an exceedingly simple and effective one. It consists simply of a flat plate with a slot cut obliquely through it near one end. The two ends of the hoop are slipped through the slot, and the tie plate is turned a certain distance. Thus turning the plate bends the ends of the hoop so that a shoulder is formed. This shoulder and the outward pressure of the cotton renders impossible the unlocking of the hoop except by the application of a pair of pincers to the same. The patentees of this invention are Z. W. and E. D. Lee, of Blakeley, Ga.

ROCK DRILL.

This invention has for its object the operating of a plurality of drills simultaneously by the rotating of a single shaft, and is more especially designed for operations on a large scale, as in mining and quarrying, where a series of holes are required to be drilled in a right line for the purpose of detaching by blasting large masses of rock in line, or co-incident with their cleavage or seams. The invention consists in the use of two clamp-bars connected by joints to boxes placed on conical or taper guide bars and connected to a rising and falling arm whereby the desired end is obtained. This improvement was designed by Francis Schwalm, of Joliet,

PRINTING PRESS.

J. A. Smith, of Fond du Lac, Wis., and Isaac Orvis, of Oakfield, Wis. (administrator of the estate of L. M. Orvis, deceased), have obtained a patent for an improved press, designed for printing from a continuous roll of paper, and possessing automatic mechanism for feeding the paper to the forms, and for printing *both* sides of the paper during one passage through the press, and cutting it into sheets of proper length; the paper being also moistened or sponged during the operation of printing. The claims for this ingenious invention were published in our last number.

BRIDGE.

This invention consists in a certain construction of a bridge of cast and wrought iron and wire rope, whereby the truss and suspension principles are combined in an advantageous manner, and a bridge of great strength and stiffness is obtained with extreme lightness. The credit of this contrivance is due to J. P. Fisher, of Rochester, N. Y., and the claims were published in our last number.

ISSUED FROM THE UNITED STATES PATENT OFFICE
FOR THE WEEK ENDING JULY 3, 1860.

[Reported Officially for the SCIENTIFIC AMERICAN.]

. Pamphlets giving full particulars of the mode of applying for patents, size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

28,949.—Calvin Adams, of Pittsburgh, Pa., for an Improvement in Door Locks:

I claim, in combination with a mortise or rim lock, a bolt having the inclines, a a, and vertical part, b, on its end, for the purpose of adapting said locks to either a right-hand or to a left-hand door, substantially as described.

28,950.—Stephen Albro, of Buffalo, N. Y., for an Improved Bed Cord:

I claim the formation of common rope cords with detached loops or reaches, to be used as bed cords, in combination with the metallic swivels, a, and catches, d and e, by which they are attached to bedsteads, substantially as described.

28,951.—Ethan Allen, of Worcester, Mass., for an Improvement in Revolving Fire-arms:

I claim providing the recoil plate of revolving fire-arms with a projection in the form of an inclined plane, so that the cylinder will be free to revolve at the first minute movement of the hammer, substantially in the manner and for the purpose set forth and described.

28,952.—I. S. Arnold, of South Milan, Ind., for an Improvement in Hay Presses:

I claim the combination with the grooved pressing chamber and follower, of the slatted top or side door, O, end door, M, and notched slide, N, substantially as specified, or the equivalents of these devices, whereby the bale may be hooped while in the press without opening the press for the purpose.

Also combining with the follower, mechanism for raising the ends of the hoops in the press without opening the latter, to secure the action of the follower upon the hoops, substantially as specified.

Likewise the arrangement of the doors, F O and M, essentially as shown and described.

And lastly, The combination with the follower, of the clutch, a, conical pulley, J, rope or chain, I, and sweep, L, substantially as specified and for the purposes set forth.

28,953.—Alexander Asboth, of New York City, for an Improved Composition for Roofing and Cement:

I claim the mode described of making a concrete by the mixture of gravel, powdered brick, oil and litharge.

28,954.—Wm. Austin, of Philadelphia, Pa., for an Improvement in Attaching Water Pipes to Buildings:

I claim the described method of attaching water pipes to buildings, whereby any one joint may be removed or replaced without either injuring the wall or disturbing the remainder of the joints, the whole being constructed and operating substantially as set forth.

28,955.—C. H. Baker, of Red Wing, Minn., for an Improvement in Steam Land Carriages:

I claim, first, The arrangement of means set forth, for connecting the engine frame to the frame or body of the carriage.

Second, The arrangement of means, as set forth, for allowing the inside wheel to accommodate itself to the movements of the carriage in turning.

28,956.—W. R. Bennett and Charles Stover, of Boston, Mass., for an Improved Mode of Polishing Varnish:

We claim the described mode of polishing japanned and varnished ware, whereby we are enabled to give a better polish with less labor than can be given in any other known matter.

28,957.—W. Birkbeck, of Jersey City, N. J., for an Improvement in Steam Engines:

I claim operating the secondary valve, V², by the excess of pressure in the newly open port, f or f', over that which is acting in the cylinder to complete the stroke of the piston, substantially in the manner set forth.

I also claim, in connection therewith, so constructing and arranging the valves, ports and passages, that the pistons, or equivalents, V V', which are moved in the chamber, a, by such excess of pressure, are themselves puppet valves for the exhaust, and make a tight contact with the seats, w w', substantially as and for the purposes set forth.

28,958.—J. S. Blood and J. W. Miller, of Newport, N. H., for an Improved Socket for Fence Posts:

We claim the socket, A, for the reception of the fence posts, constructed substantially as described.

28,959.—Ezekiel Booth, of Troy, N. Y., for an Improvement in Sewing Machines:

I claim causing the spreader, c, to spread the loop of the looper thread by a mechanism that is independent of the mechanism that operates said looper, and whilst said looper remains stationary and after the needle has cleared the same, substantially in the manner and for the purpose described.

28,960.—W. E. Boulger, of Janesville, Wis., for an Improvement in Machines for Cutting Fats:

I claim, first, The combination of the rotary serrated knives, C, and stationary knife, D, constructed and arranged substantially as and for the purposes explained.

Second, The arrangement of the beater, I K, in the described relation to the rotary knives, C, and stationary knives, H, acting to re-cut the fat and also preserve the knives, C, from clogging, as set forth.

Third, The vertical sliding plate, F, and springs, s, in combination with the knife, D, substantially as and for the purposes set forth.

28,961.—C. A. Boynton, of Hyde Park, Vt., for an Improved Clothes-frame:

I claim a clothes-dryer composed of two hubs, A C, arms, B, braces, E, ropes, c, legs, J, and rod, F, arranged and constructed as shown and described.

[This invention consists in arranging a series of radial arms jointed to a hub in such a manner that they will open and close, and in bracing and strengthening said arms by a second series of radial jointed braces, which are connected to a second hub placed above the first hub, through both of which hubs passes a rod to which is attached an elevating cord that passes up and over a pulley attached to the ceiling of a room, or to a suitable frame planted out of doors; said frame is to be furnished with a suitable number of cords passing around the same and through holes in the radial arms; the clothes to be dried are hung on the cords and the force of the wind keeps the frame in motion.]

28,962.—J. F. and I. W. Bristow, of Vevay, Ind., for an Improved Machine for Jointing Staves:

We claim the guides, F F', stops, O, cross-head, M', vertical piece, M, and spring, N, arranged substantially as and for the purposes set forth.

We also claim the vibrating lever, H, links, I, stops, J, bolt, L, and springs, L', for operating frame, P, and clamping the stave, substantially as described.

We also claim the groove, V, in the knife, U, to act as a guide, and prevent it becoming dull, by passing over the guides, F and F', as set forth.

28,963.—T. A. Bryan, of Queenstown, Md., for an Improved Dredging Apparatus:

I claim the arrangement of the vertical drum, A, with the cable, P, the pulley float, N, the bucket, B, and the mud receptacle, C, substantially in the manner and for the purposes set forth.

28,964.—R. P. Buttles, of Mansfield, Pa., for an Improved Wrench:

I claim, first, Constructing the die with a transverse groove across the face for the purpose of holding a straight bar-crotch wrench, for the purpose set forth.

Second, Constructing the handle of the wrench with an open space or recess at the end above the die seat, in combination with a die open at the side, whereby the same die is available both as a socket and crotch die.

Third, The combination of the projecting flange on the die with the pawl, when so arranged as to project over this flange and hold the die to the ratchet handle.

28,965.—Angus Campbell, of Jersey City, N. J., for an Improved Apparatns for Working Anchors:

I claim, first, The plate, f, hinged to the rolling block, d, for the purposes and as specified.

Second, I claim the chain, g, attached at one end to the rolling block, d, and at the other end taking the pin, 5, for holding the anchor in place, or disconnecting by the self-acting movement in casting anchor, as set forth.

Third, I claim the slide, 6, and T-shaped end, 7, to the chain, i, for liberating the ring of the anchor when the slide, 6, is allowed to move, as set forth.

Fourth, I claim the combination of the stopper, k, and rolling block, d, by means of the chain, l, whereby both ends of the anchor can be simultaneously liberated, as described and shown.

Fifth, I claim the chain, m, and wheel, n, in combination with the rolling block, d, and acting in the manner and for the purposes set forth.

28,966.—C. W. Chapman, of Hartford, Conn., for an Improved Ice-breaker:

I claim the arrangement of the cylinder, A, draw, B, and toothed disk, D, in combination, for the purpose and in the manner set forth and described.

28,967.—L. S. Chichester, of New York City, for an Improved Lemon-squeezer:

I claim the combination of cap, E, cone, C, and cup, A, substantially as and for the purpose described.

[The object of this invention is to obtain a simple, economical and durable implement, whereby lemons may be squeezed for domestic purposes with much less power and with far greater facility than by the ordinary squeezers in general use.]

28,968.—Council Clark, of Andersonville, Ga., for an Improvement in Cultivators:

I claim the arrangement of the arched brace, c c c', in combination with the plow beam, d, standard, a, and runner, j, in the manner and for the purposes set forth.

[This invention consists in providing the plow beam with an inverted arched brace for supporting the standard, and for supporting a runner which forms the rows for cotton seed and grain. This is a simple but good plow stock, as it serves for supporting every variety of tool that is used for cultivating the soil.

28,969.—A. B. Cooley, of Philadelphia, Pa., for an Improvement in Dumping Railroad Cars:

I claim the body, A, of the car, having at or near the opposite ends the wheels, b b, turning on permanent axles, and any convenient number of doors, D, carrying wheels, h h, in combination with rails, H and H' and I and I', so constructed and arranged that, as the car traverses the said rails, the doors may be self-opening and self-closing, as set forth, for the purpose specified.

28,970.—N. B. Cooper, of Gratis, Ohio, for an Improved Churn:

I claim the described mechanism for operating a churn-dasher, the same consisting of the following parts: base, B, upright, E, block, c, hand lever, F, pivoted bar, d, links, e f, and springs, k l, as combined and arranged in relation to each other, for the purposes specified.

28,971.—L. E. Cushman and J. S. French, of North Bloomfield, Cal., for an Improvement in Rock Drills:

We claim, first, The arrangement of the swinging weight, C, drill rod, F, ratchet, G, and the pawl, H, attached to rock shaft, E, in combination with the adjusting frames a, b, c, operated substantially as and for the purpose set forth.

Second, The handle, D, when attached to the weight, C, by means of the joints and segment bar, to admit of the lateral adjustment of the handle as specified.

[This invention consists in the employment or use of a swinging weight arranged with a drill and automatic turning or rotating device, all being placed on a mounted and adjustable frame, and so arranged that the drill may be made to operate at any desired angle as the nature of the case may require, and the power or strength of the operator (if the machine be operated manually) be applied in the most advantageous manner to the machine, the latter also being capable of being readily removed from place to place, and adjusted to its work.]

28,972.—Henry Dalton, of New York, N.Y., for an Improvement in Trusses:

I claim a truss, combining the belt, A, slide, C, hinge, E, and set screws, h h, when the same shall be arranged and operated as herein described, and for the purpose specified.

28,973.—Charles Disston, of Philadelphia, Pa. for an Improved Potato-parer:

I claim the method herein described of adjusting the blade to the guard, by means of the milled ferrule, in combination with the nut B, on the shank of the blade, substantially, as set forth.

28,974.—Celestino Dominguez, of San Francisco, Cal. for an Improvement in Quartz-crushing Apparatus:

I claim combining a crushing apparatus with a pulverizing apparatus, when constructed and operated as herein set forth.

I also claim in combination with a pulverizing apparatus, constructed and operating as described, an amalgamating wheel, T, having a metal bottom, i, and working on a metallic plate, m, in the manner and for the purpose herein set forth.

28,975.—Timothy Drake, of Windsor, Conn. for an Improved Machine for Sawing Boards into required Lengths:

I claim the combination and arrangement of the vibrating circular saw frame, C, and its saw, D, with the swinging feed roller frame, F, and its roller, g, the gauge head, H, with an opening in the table, as represented, to allow the cut boards to fall after they have been sawed off—all operating in the manner and for the purposes herein set forth.

28,976.—John Dykeman, of Greenbush, N. Y., for an Improved Variable Exhaust for Locomotive Engines:

I claim the arrangement of the conical nozzle, C C, with the exhaust pipes, B B, as constructed, in such a manner that four steam passages may be employed when necessary, or only two may be used, and the steam concentrated in said nozzles, thereby, diminishing or increasing the draught of the fire, as is herein fully set forth.

28,977.—A. H. Enholm, of St. Louis, Mo., for a Burglar Alarm:

I claim the described arrangement of the spring, F, the hammer, D, and the trigger, Y, within the shell or frame, A', constructed as described.

I also claim the combination of the barrel, C, with the described arrangement of spring, F, hammer, D, and trigger, Y, within the frame or shell, A, for the purpose specified.

28,978.—Richard J. Gatling, of Indianapolis, Ind., for an Improvement in Cotton Cultivators:

I claim, first, A rotary cutter head, provided with hoes or cutters capable of being adjusted to vary the depth of their cut, as well as to escape or pass over obstructions that may be in their path, substantially as herein shown and described.

Second, The employment of two adjustable plow-shares or scrapers, capable of scraping or cultivating both sides of the rows of cotton or other plants, by once passing over the ground, when arranged and constructed substantially as set forth.

28,979.—Daniel G. Gerard, of Patchogue, N. Y., for an Improved Center-board for Vessels:

I claim the arrangement and combination with a centre-board, C, in the manner herein shown and specified, of the lateral rollers, a a, projecting through upon each side of the board, C, the longitudinal end rollers, b b, lifting shaft, G, driving shaft, I, and gear wheels—all as set forth, and for the purposes specified.

[This invention is an improved mode of hanging and operating center-boards for large or small sailing vessels, whereby the board may be raised or depressed, as occasion may require, by the helmsman from his post at the stern of the vessel, and the board is made so as present a greater or less superficial area to the water.]

28,980.—John Griffin, of Louisville, Ky., for an Improvement in Cotton-pickers:

I claim, first, The arrangement of the cylinder, F, chamber, C, valve chest, B, and exhaust receiver, G, in connection with the picker tube, A, and cup, B, substantially as and for the purpose set forth.

Second, The arrangement of the picker tube, A, with the condensed air chamber, C, valve chest, D, and pipe, O, communicating with the cup, B', and valve chest, as and for the purpose specified.

Third, Attaching the cotton-conducting tube or tubes, N, to the carriage, by means of the tube, Q, suspended or hung on trunnions, N N', and the hollow stem, R, fitted within the tube, Q, and secured therein by the springs, S S, substantially as described.

Fourth, The combination of the flexible and open tubes, N, for the purpose specified.

[This invention relates to certain improvements in a machine for picking or harvesting cotton, for which Letters Patent were granted to this inventor, bearing date March 8th, 1859, and November 22d, 1859. The object of the invention and improvement is to save or economize in power and render the device generally more practical than either of the devices previously patented.]

28,981.—Wm. Griffin, of Bennettsville, S. C., for an Improvement in Plows:

I claim in connection with a mould board and landside, in one piece, and united to the standard, E, by a strap and key, the arrangement of the two braces, J K, as herein described and represented, for holding the several parts to the beam, as set forth.

28,982.—W. S. Harrison, of Carson's Landing, Miss., for an Improvement in Adjusting Tire on Wheels:

I claim the metal felly, B, lips, c c, at the ends of the tire, C, the screw rod, D, and cap, E, arranged and applied to the wheel, substantially as and for the purpose set forth.

28,983.—Wm. Hathaway, of Providence, R. I., assignor to himself and David H. Tillson, of same place, for an Improved Clothes Frame:

I claim the combination of the cross bars of the frame with a hinge collar so arranged that the end of the bar pivoted to the collar extends beyond the joint pivot towards the centre of the collar, and bears against the under side of the arms and is supported by them from dropping, substantially as described, for the purpose set forth.

[The object of this invention is to adjust or secure the tie on the wheel in such a manner that it may be tightened and relaxed at pleasure to compensate for any shrinkage or swelling of the wheel. The invention consists in the employment or use of a metal sectional felly in connection with a screw rod, cap and lips on the tire.]

28,984.—Jeremiah Heath, of Providence, R. I., for an Improvement in Skates:

I claim the runner made in two parts, A A', and united by a slip joint, in combination with the elastic steel sole plate, B, the whole arranged and operating upon the principle set forth.

28,985.—A. T. Howard, of Hartford, Vt., for an Improvement in Odometers:

I claim, first, The cam-shaped tooth, g, constructed and combined with a toothed wheel, in the manner described, to impart an intermittent motion to the said wheel, and prevent its rotation at other times.

Second, The combination and arrangement of the plate, D, eccentric pawl, E, and ratchet wheel, G, for the purposes set forth.

28,986.—W. W. Hurlbut, of Muscatine, Iowa, and J. B. Hurlbut, of Chicago, Ill., for an Improved Machine for Sawing Staves:

We claim, first, The arrangement of the saws and manner of adjusting them to any required angle, to cut a plane-faced stave for barrels of larger or smaller dimmeter.

Second, The stave cut straight from each outer edge to the center, forming any required angle, in the manner as above described, or its equivalent.

28,987.—B. A. Jenkins, of Whitewater, Wis., for an Improvement in Machines for Wind-rowing Sugar Cane:

I claim the combination in the manner described of two furrow plows, H H, arranged to turn furrows in opposite directions with a cane-windrowing machine, constructed and operating substantially as described for the purpose specified.

[This very novel machine cuts the cane, places it in continuous lines in the hollows between the rows, and turns up a bank of earth against each side of the rows. The cane must be thus cut at certain seasons to guard it against frost: and it must be placed in windrows with the butts covered by the tops and leaves of the cane, and have the sides compacted together by the furrows of earth bearing up against it, to keep it cool and avoid fermentation and souring. This preservative process has always heretofore been performed by hand at great expense, which this machine will greatly reduce, and also obviate the inconvenience arising from the hurrying of the grinding operation, and prevent the immense losses which are often incurred from the effect of sudden frost.]

28,938.—A. B. Johnson and M. H. Vaughan, of Clarksville, Ark., and J. Stinnett, of Shelby county, Tenn., for an Improvemment in Detaching Horses from Vehicles:

We claim attaching the pole or thills of a carriage to the front axle by means of the lugs, h, which fit into triangular recesses of the brackets, F, the latter being secured to the front axle, substantially in the manner described.

We also claim, in combination with the thills, K, lugs, h, brackets, F, bolts, K, and rock shaft, G, the lever, L, for operating the bolts, k, substantially in the manner described.

We also claim giving the lever, L, by which the rockshaft, G, is operated, a curved shape, so as to embrace the hub of the wheel when operated, and to arrest the motion of the carriage, when the horses are detached therefrom, substantially in the manner described.

28,989.—Wm. Joslin, of Cleveland, Ohio, for an Improvement in Mills:

I claim, first, The dividing the runner and reversing the motion of the separate parts, as described.

Second, The introduction of air through the unbroken space between the upper runner, B, and lower runner, A, from the fans, N N N N, in the upper runner, B, as specified.

Third, The self-regulating feed ring and hopper bottom for regulating the feed of the grain, as set forth.

28,990.—C. F. Langford, of Fall River, Mass., for an Improvement in Railroad Brakes:

I claim hinging the levers, D, which support the brake rubbers, to the ends of the pedestal brace, B, when constructed and operated substantially as described.

28,991.—Z. W. Lee and E. D. Lee, of Blakeley, Ga., for an Improvement in Cotton Bale Ties:

We claim the tie plate, C D, constructed, applied and operating as described for the purpose set forth.

28,992.—James Martin, of Florence, Ala., for an Improvement in Water Wheels:

I claim in center-vent water wheels, the combination of the horizontal sluices D, vertical pipes, E E, and chutes C C, when arranged relatively with the buckets of the wheel, the whole constructed and operated in the manner and for the purpose set forth.

[This invention is a novel arrangement of parts, whereby a full head of water may be brought to act upon all the buckets of a center-vent wheel; at the same time the water will have a free discharge, and will not be crowded back against the bucket, as is the case with turbine wheels generally. The issues or influx of water is brought in such a relation to the buckets as to suit the different velocities of the wheel under different heads of water, and the water will act upon the buckets with greater effective force or impact.]

28,993.—J. S. McCurdy, of Brooklyn, N. Y., for an Improvement in Sewing Machines:

I claim driving the needle of a sewing machine by means of a wrist pin, or its equivalent, attached to a gear or wheel which is caused to roll round a stationary gear, wheel or circle of a similar diameter, and so to give the said wrist pin, or equivalent, an epicycloidal movement, substantially as described.

[This invention consists in driving the needle of a sewing machine by means of a pin, wrist, or its equivalent, attached to a gear or wheel which is caused to roll round a stationary gear, wheel, or circle, of similar circumference, and so to give the said pin an epicycloidal movement, by which it is caused to give the needle a rapid motion during that part of its movement which takes place while it is out of the cloth or other material being sewed, but to produce the necessary retardation of its movement while in the material, to allow time for the entrance of the shuttle or looper into the loop of the needle thread.]

28,994.—N. L. McFarlan, of Syracuse, N. Y., for an Improvement in Attaching Sash Stops to Windows:

I claim said self-adjusting window spring and stop-fastener.

28,995.—C. S. Moore, of Alexandria, Va., for an Improved Mode of Connecting Car Bodies with Trucks:

I claim securing the trucks of a car, locomotive, or tender, to the body or frame by means of the connections described, so that whilst the trucks have the usual play on the body or between the rails, they will, in case of the breaking of the wheels, or axles, or both, be held parallel, or nearly so, to the body or frame, and thus prevent the car, locomotive or tender, from being thrown off the track, substantially as described.

28,996.—Hugo Mueller, of New York City, for an Improvement in Sewing Machines:

I claim the so connecting of the needle arm of a sewing machine with the driving shaft thereof, as that the said arm or the needle bar which it drives may be instantly stopped or started, whilst the shaft runs continuously and at full speed, substantially in the manner and for the purpose described.

28,997.—F. W. Nichaus, of Boston, Mass., for a Pianoforte Action:

I claim arranging not only the support bar, D, and the fulcrum of the lever, B, between the back catch, F, and the fly, E, but the regulator cam, d, on the back of the supporting bar and its adjusting screw, f, in such bar, in manner as specified.

I also claim applying or arranging the back draft strap to K, the back catch, F, and the loaded arm, I, as described.

I also claim the arrangement of the damper lever relatively to the hammer and its back rest block—that is, placing it between the head and tail block of the hammer, and so as to pass under the back rest bar, as specified.

28,998.—J. B. Morris, of Berryville, Va., for an Improvement in Tuning Pianos:

I claim the manner or mode of tuning pianos, harps, and other similar instruments by means of a grooved pulley, h h, in the end of an adjusting tightening screw and draft pin, e e f f, by combining and arranging said devices with a continuous string, k k k k, passing around the pulley, h h, so that the point of contact and draught in the center or middle of the string, instead of at the extremities, and by which means the pressure or strain of the string is divided upon the center or middle, and at both extremities where hitched; thus giving an equality of draught throughout both parallel lengths, k2 k2, and through all of which the parallel lengths, k 2 k2, are readily and most perfectly put in unison, or tuned to the required degree of unison or pitch, or slackened as desired, substantially in the manner as set forth and described.

28,999.—T. J. Penny and Wm. B. Botsford, of Wooster, Ohio, for an Improvement in Sewing Machines:

We claim the combination of the wiper, J, the rising and falling upright rockshaft, J', the arm, J 2, rod, L, and inclined plane, J, with the needle lever, D E, and feeding slide, I, substantially as described, to produce the necessary movements of the feeding slide by means of the needle lever.

[This invention consists in a simple mode of operating the feed mechanism through the agency of the needle lever.]

29,000.—Wm. Phelps, of Sycamore, Ill., for an Improvement in Transmitting Motion to Machinery:

I claim the combination of the disks, B C, and D, and rollers, G and H, operating substantially as and for the purposes set forth.

29,001.—Wm. Phelps, of Sycamore, Ill., for an Improvement in Car Axles:

I claim the swiveled axle, A B, disk plates, D and E, yoke, G, and rollers, H, constructed and combined substantially as and for the purposes set forth.

29,002.—B. L. Phillips, of Providence, R. I., for an Improvement in Machines for Engraving Copper Cylinders:

I claim, first, Making the carriage of the graver-supporter in two parts, D and C, and hinging them together as set forth, for the purpose specified.

Second, Connecting the carriage, D C, with the shaft, X, by means of metallic bands as set forth, for the purpose described.

Third, The shoe, F, upon the end of the graver arm, as applied to machinery for engraving cylinders.

29,003.—Carey Pitts, of Troy, N. Y., for an Improved Sawing Machine:

I claim raising a saw or saw gate by a positive motion and against the action of a spring, which spring, when the raising mechanism ceases to act, brings down the saw into the stuff to be cut, with a quick jerk or motion, substantially in the manner described and represented.

29,004.—D. R. Prindle, of East Bethany, N. Y., for a Combined Pressure and Vacuum Valve for Steam Boilers:

I claim the construction, arrangement and combination of parts, substantially as described, so as to produce a combined expansion and vacuum valve entirely unattached, except by its weight and simple contact, to the boiler or vessel in which it is used, and consequently portable and transferable for the conveniences and purposes specified.

29,005.—Veitus Radspinner and W. H. Moss, of New Richmond, Ohio, for an Improved Lubricating Compound:

We claim the preparation of a homogeneous lubricating compound of the ingredients, in the proportions and in the manner substantially as set forth, for application as a lubricator to all surfaces subject to friction.

29,006.—F. J. Rice and G. W. Hayward, of Providence, R. I., for an Improvement in Rollers for Pressing Dough:

We claim, as a new article of manufacture, a hand roller covered with vulcanized rubber or gutta-percha, and furnished with handles, B, for the purpose of rolling dough against cutters in making candies or confectionary, as set forth and explained.

29,007.—E. S. Ritchie, of Brookline, Mass., for an Improved Mechanism for Stopping and Starting City Railroad Cars:

I claim the combination of the following elements or their mechanical equivalents, adapted and arranged together as explained, viz:—

1. The spring, F.
2. The two separate barrel-heads connected respectively with the ends of the spring, F.
3. The two clutch gears or ratchets I I'.
4. The two clutches, H I, and—
5. The two friction brakes of the two heads, c d—such combination being applied to the wheel axle, and so as to operate substantially in manner and for the purpose as described.

I also claim the combination of mechanism applied to both ends of the carriage, to the brakes and the clutches, and for operating the brakes and clutches from either end of the carriage as specified.

29,008.—H. H. Robertson, of Kingston, Mo., for a Fly Trap:

I claim the employment of the vertical suspension standard in combination with a case having an opaque funnel-shaped fly entrance passage at its top and tubular opaque fly entrance passage at its bottom, substantially as and for the purposes set forth.

[This trap has four glass sides; a central standard, on which sweets attractive to flies are placed, projects up from the bottom of the trap. The top of the trap is shaped like a funnel and extends down into the chamber formed by the glass sides. Entrance passages for the flies are formed in the bottom and top of the trap. The trap is hung up by a cord, and the flies pass down the standard and up through tubes at the bottom. The light through the glass sides attracts the flies, and after they have satisfied their hunger, to escape, they fly in the direction of the light, but this flight of fancy seals their fate, for they never find an exit after they leave the central standard. This is an ingenious and useful article.]

29,009.—Charles Rose, of Allentown, Pa., for an Improved Device for Straining Scroll Saws:

I claim the combination of the lever, link, hook, thumb, nut and noddle iron, substantially as described, for the purpose of making a convenient and effective connecting and disconnecting device for the saws of scroll-sawing machines and for straining them up in the gate as set forth.

29,010.—John Ruof, Anthony Heupel and Frank Leuthy, of Lancaster, Pa., for an Improvement in Grinding Mills:

We claim the two plates, E F, arranged and operating as described when their dress is laid off in spiral eccentric grooves, c c' c'', as described and represented for the purpose set forth.

[This invention consists in a novel means of setting and adjusting the shaft of the lower runner in grinding mills, so that the shaft may always be kept running in a close journal box and in good working order.]

29,011.—Francis Schwalm, of Joliet, Ill., for an Improvement in Rock-drilling Machines:

I claim the clamp bars, I I', when attached to the boxes, J, which are formed of two laterally-sliding parts, c d, fitted on conical or taper uprights, A, and operated through the medium of the rods, H, and arms, L L, substantially as and for the purpose set forth.

I further claim the adjustable bar, F, one or more, when applied to the bars, I I', substantially as shown, to admit of the simultaneous employment of drills of varying diameters.

29,012.—Frederick Seidle and Samuel Eberly, of Mechanicsburgh, Pa., for an Improvement in Horse Rakes:

I claim the combination of the rocking frame supporting the rake with a spring pressure bar extending across the rake teeth and bearing upon them, back of their rear support on the frame.

29,013.—J. G. Shafer, of Fulton county, Pa., for an Improvement in Mill Bushes:

I claim the combination of the follower, F, the pawls, p, and ratchet, R, to form a mill bush which will tighten itself by the operation of gravity, substantially in the manner described.

29,014.—Gideon Sibley, of Troy, N. Y., for an Improved Machine for Turning Cylinders:

I claim, first, The spiral cutter, E, varied in the form of its surface and edges according to the form to be cut upon the block, as described.

Second, The spiral cutter, E, in combination with the several pairs of spindles, a a', arranged and operating substantially as described.

Third, The mode of rotating and holding the cylinder bearing the spindles, a a', &c., by means of a crank wheel, C, and cam, i, the latch arm, 2 and latch, f2, stop rod, d, and the ratchet wheel, I, arranged and operating substantially as described.

Fourth, The compressing arch, Y, constructed and operating in combination with the spindles, a' a', &c., substantially as described.

29,015.—G. S. G. Spencer, of Boston, Mass., for an Improvement in Apparatuses for Distilling Sea-water:

I claim the arrangement of the receptacle, B, in combination with the boiler, A, and condenser, C, in the manner substantially as and for the purposes set forth.

29,016.—G. R. Stevens, of Clarksville, Mo., for an Improvement in Shoeing Horses:

I claim the combination of the sliding rest, b, with a swinging frame, e a c c, guide or rollers, d d, and arched guide way, g, for the purpose of constructing an adjustable rest for a horse's foot while being shoed, substantially as set forth.

29,017.—A. J. Sweeney, of Wheeling, Va., for an Improvement in Molds for Glass Goblets:

I claim the combination of the block, D, with the piece, K, or its equivalent and with the piece, E E', operating as above described and for the purpose set forth.

29,018.—Phil Tompert and John Coyle, of Louisville, Ky., for an Improved Apparatus for Rendering Fats:

We claim, as an improved article of manufacture, a tub, A, arranged with a kettle, C, and steam pipe, E, with the perforated branches, c, and a cold water pipe, F, and faucets, e and f, as and for the purposes set forth and described.

[This invention consists in surrounding the kettle with a steam jacket by which the steam is conducted through a pipe terminating in two bent branches perforated with holes of different sizes, for the purpose of causing the steam to heat all parts of the kettle with equal intensity, and which steam jacket communicates through a suitable pipe with a cold water reservoir, and which is further provided with a series of faucets for the purpose of regulating the heat, and to draw off the cold water and also the steam or the hot water.]

29,019.—A. P. Torrence, of Oxford, Ga., for an Improved Machine for Felling Trees:

I claim the two levers B D, provided respectively with the cutter, A, and rollers, C E, and connected by the bars, F, substantially as and for the purpose set forth.

[This invention relates to an improvement on a tree-felling and girdling machine for which Letters Patent were granted to this inventor, bearing date Dec. 3, 1850. The object of the invention is to simplify the patented device above alluded-to without in the least detracting from its utility.]

29,020.—Horace Trumbull, of Jersey City, N. J., for an Improvement in the Manufacture of Glass:

I claim the substitution of the oxyd of zinc for the oxyd of lead in the composition of ordinary flint glass, substantially in the manner and for the purpose fully set forth.

29,021.—S. T. Vallett, of Providence, R. I., for an Improved Washing Machine:

I claim the arrangement in the interior of the tub or box, A, of the central slatted clothes chamber, D, in combination with the revolving fans, F, constructed and operating as and for the purposes specified.

[This invention consists in arranging in the interior of a tub or box a central slatted clothes chamber, in combination with two fans revolving in opposite directions, for the purpose of agitating the water and forcing it through the clothes, thereby cleaning the same in a quick and easy manner and without the least injury to the fabric.]

29,022.—I. W. Van Houten, of Philadelphia, Pa., for an Improvement in Car Couplings:

I claim, first, Reducing the lower end of the coupling pin, D, and forming a collar, c, on the same, the part reduced and the collar being so arranged in respect to the upper opening, i, of the buffer piece, that the pin is rendered self-retaining in an elevated position in the said opening, as set forth.

Second, Forming on the pin an enlargement with upper and lower bevels—the said enlargement being arranged in respect to the larger lower opening and smaller upper opening of the buffer block, as and for the purpose set forth.

29,023.—C. J. Van Oeckelen, of New York City, for an Improvement in Melodeons:

I claim the combination of the support, B, uprights, D D, and melodeon, A, when the same shall be arranged and operated as described and for the purpose as set forth.

29,024.—W. M. Wallace, of Cameron, Ill., for an Improvement in Portable Fences:

I claim a portable fence in which the posts, A B and C, are combined with the rails, D E F, as described and shown and for the purposes set forth.

29,025.—Jerome Wheelock, of Worcester, Mass., for an Improvement in Centrifugal Governors for Steam Engines:

I claim the hold-fasts, F F, and the springs, G G, constructed and operating in the manner as set forth and described.

29,026.—William Wilmington, of Toledo, Ohio, for an Improvement in Harvesting Machines:

I claim the combination of the contracting hinged platform, the rotary reciprocating rakes, O O', and short threshing cylinder, when the parts are arranged and operated jointly with the harvesting and winnowing apparatus in the manner and for the purpose specified.

29,027.—J. C. Wilson, of Cedar Hill, Texas, for an Improvement in Gang Plows:

I claim the arrangement of the plow frame upon the wagon frame as and for the purpose described.

29,028.—E. A. Wood, of Utica, N. Y., for an Improvement in Boiler-feeders for Steam Engines:

I claim the arrangement of the float, L, cylinder, N, and piston, O, constructed and operating as described, in combination.

Also, the said float, cylinder and piston constructed and operating as described, in combination with the alarm whistle.

29,029.—Hjalmar Wynblad, of West Hoboken, N. J., for an Improved Mousing Hook:

I claim, as a new article of manufacture, the projection, p, on the hook, the ring, r, having a recess or notch, n, on the inner peripheries, and the spring, s, arranged substantially as and for the purpose specified.

29,030.—Christian Yost, of Intercourse, Pa., for an Improved Machine for Pointing Fence Rails:

I claim the traversing carriage, I I, combined with the pivoted and grooved bars, K K, and sliding swivel jaws, M M, constructed, arranged and operating in the manner set forth.

29,031.—C. W. Baldwin, of Boston, Mass,, assignor to himself and Henry Messer, of same place, and Luther Aiken, of Malden, Mass., for an Improved Fastening for Garments:

I claim the new article of manufacture for fastening garments, described, to wit: a garment fastening consisting of one, two or more link hooks fastened to a plate substantially as described.

29,032.—N. S. Bean and J. G. Collins (assignors to the Amoskeag Manufacturing Company), of Manchester, N. H., for an Improved Steam Boiler:

We claim the described relative arrangement of parts in a vertical boiler having five tubes—the same consisting of an enlarged fire-box and dome, contracted waist and submerged smoke box, substantially as set forth.

29,033.—S. A. Briggs (assignor to himself and C. G. Crowell), of Philadelphia, Pa., for an Improvement in Corn and Cob Mills:

I claim the application of the spiral propeller vanes, g g, around the cylinder of the rotary crusher, A, when the same are arranged in relation to the arms, h h, substantially as and for the purpose specified.

I also claim the application of the stops, n n, in combination with the grooves, j j, and ridges, m m, on the disks, B' and C', substantially in the manner and for the purpose set forth and described.

29,034.—Arnold De Witt (assignor to himself, John Wiarda and J. H. N. De Witt), of Brooklyn, N. Y., for an Improvement in Windmills:

I claim the employment of a series of revolving fans, A, with gear wheels, d, arranged around a stationary cog wheel, e, in a rotary frame, B, together with an adjustable scroll, D, substantially in the manner and for the purpose specified.

[This invention consists in arranging in a rotary frame a series of fans to which a rotary motion is] imparted by a stationary cog wheel in the center of said revolving frame, and gearing into corresponding cog wheels on the ends of the rotary fans—the whole being inclosed in a round or polygonal scroll with a spout to conduct the wind to the fans in such a manner that a light, simple and powerful windmill is produced.]

29,035.—John First (assignor to himself and Isaac Frost), of New York City, for an Improvement in Sewing Machines:

I claim the combination and arrangement of the crook, C, lever, D, radius bar, E, crank or lever, G, and connection, H, for the purpose of giving the proper periods of rest and motion to the needle of a sewing machine, substantially as described.

29,036.—I. M. Gattman (assignor to himself and H. G. Steibel), of Cincinnati, Ohio, for an Improvement in Brick Machines:

I claim, first, The plunger, H, slide, I, and lateral slides, J J', arranged and operating in combination substantially as and for the purpose set forth.

Second, The shafts, b and c, at right angles, bevel wheels, E F, and cams, f f' g g', or their equivalents, in connection with plunger, H, slide, I, and lateral slides, J J', arranged and operating substantially as and for the purpose set forth.

29,037.—S. H. Jones, of Jamaica Plains, Mass., assignor to H. W. Smith, af West Newton, Mass., and S. D. Smith, of West Roxbury, Mass., for an Improvement in Melodeons:

I claim, with a single set of bass and treble reeds and two swell valves therefor, arranging one swell valve at the back of the reed board and the other swell valve at the front thereof, substantially as and for the purpose described.

Also, arranging the two sets of the treble and bass reeds relatively to the line of range of valve pins and with respect to each other as specified.

29,038.—G. A. Keene (assignor to himself and S. D. Woodbury), of Lynn, Mass., for an Improved Combined Bed and Chair:

I claim the combination and arrangement of a bedstead, extension bed or couch and chair, substantially as specified.

29,039.—Lester Patee (assignor to himself and A. H. Ryan), of Peoria, Ill., for an Improvement in Soldering Irons:

I claim the use of a heating center of wrought or cast iron for soldering, in connection with a movable, tinned, copper, cap, when the latter is constructed with a spiral spring, as set forth, for the purpose of keeping the cap and center in contact under varying temperatures.

29,040.—E. W. Rowe (assignor to himself and J. T. Hardy), of Brewer, Maine, for an Improvement in Drain Tiles:

I claim the tongue, c, and groove, d, arranged on opposite s des of, and in combination with, the tile, substantially as and for the purpose specified.

I also claim molding or forming the clay or plastic drain tile above described with the tenon recess and the tenon for side connections, in the manner and for the purpose set forth.

29,041.—H. W. Smith, of Boston, Mass., assignor to himself and S. D. Smith, of West Roxbury, Mass., for an Improvement in Harmoneons:

I claim, when two sets of valves are employed with a supplementary lever to be operated by the key as described, constructing that part of the key frame which supports the key separate from that which supports the supplementary lever, and hinging or applying the two together so as to enable the key and its supporting part of the said key frame to be raised or moved in such manner as to enable access to be had to the inner reed-holders as occasion may require.

29,042.—H. A. Wills (assignor to A. W. Kingsland), of Keeseville, N. Y., for an Improvement in Machines for Making Horse-shoes:

I claim the arrangement of the movable front substantially as described, when the same is used in combination with the shaping die or mold, E, on the surface of the rotary cylinder, B', for the purpose set forth.

Also, The arrangement of the stationary cam, i, crank, h, spring, j, and front, f, in combination with the shaping die or mold, E, constructed and operating as and for the purpose specified.

[This invention consists in arranging the shaping die or mold of a cylinder machine with a movable front which, when thrown forward, bends the iron to the required shape and holds it in the proper position until the swaging die gripes it, and then, being thrown back, allows the iron to spread. It also consists in the employment of a crank-shaft which is subjected to the action of a spring, and the bent end of which sweeps over a stationary die which is rigidly attached to the side of the frame which forms the bearings for the cylinders, so that, at the proper intervals, said front is drawn in and the iron set free.]

RE-ISSUES.

James Albro, of Elizabeth, N. J., for an Improvement in Printing Oilcloth. Patented June 7, 1859:

I claim forming ornamental figured surfaces on oilcloths by raising, at right angles with each other, by means of properly prepared blocks, parallel ridges or surfaces, b d, substantially as described, to form, by the action or reflection of light, and with or without a plurality of colors, the damask ground and figure, it being understood that I claim the privilege of having either the ground or figure, one only if desired, composed of dots or broken lines, in order to obtain a similar effect.

James Albro, of Elizabeth, N. J., for an Improvement in Printing Oilcloth. Patented June 7, 1859:

I claim, as a new article of manufacture, an oilcloth with an ornamental figured surface, produced by means of raised lines or ridges, those forming the ground being at right angles to those forming the figure, substantially as described.

Douglas Bly, of Rochester, N Y., for an Improvement in Artificial Legs. Patented May 17, 1859:

I claim, first, Curving or deflecting the jointed extremities of the bars, J, so as to bring their axes of motion back of their line of direction, substantially as and for the purposes set forth.

Second, I claim the cord, T, and spring, X, acting upon the parts, D and L, substantially in the manner and for the purpose set forth.

Third, I claim the combination of the non-elastic tendon, F, with the india-rubber spring, E, in such a manner that the required effect is derived from the compression and expanson of the material, and not from its elongations and contraction, substantially as set forth.

Fourth, I claim the use of the block, A, with its longitudinal and transverse axes, for producing the direct or antero-posterior lateral and diagonal motions of the ankle joint in walking, while retaining the foot in its proper relative position to the leg, substantially as described.

Fifth, I claim providing the ends of the cords, F, with the enlargements and with the conical socket fastenings, G, to receive the same, substantially as described, in order to apply adjusting screws, for the purposes specified.

Sixth, I claim the manner of constructing the bearing portions of the knee joint, consisting of the upper and lower bearing blocks, N N, each of which forms the quarter of a circle more or less corresponding with the axial bolt, the one being fixed in position and the other adjustable by means of the screws, s s, to admit of adjusting the parts together to prevent looseness and noise, and to reduce and regulate the friction, substantially as and for the purpose set forth.

Reuben Jane, of Otego, N. Y., for an Improvement in Attaching Paddle Wheels to Canal Boats. Patented Nov. 24, 1857:

I claim, first, The bow wheels, B, the connecting rods, K, the rudder, L, the operating lever, O, constructed and arranged substantially as and for the purposes described.

Second, I claim the wheels, B, constructed with twisted floats, in combination with the preceding.

Third, I claim the arrangement of the vertical slotted shaft, N, supporting the wheels, B, and gearwheel, C, in combination with the preceding, the whole operating as described and set forth.

J. B. Palser and Gardner Howland, of Fort Edward, N. Y., for an Improvement in Apparatuses for the Manufacture of Paper Pulp. Patented June 21, 1859:

We claim, first, Having the pipe, p, which passes through the hollow journal of the boiler divided by a partition, s, so that the steam may find exit through one compartment of the pipe and the contents of the boiler through the other compartment, as set forth.

Second, The employment of the perforated diaphragm, p p', when arranged substantially as described, to protect the pipes, h h' s s', and strain the liquids from the "stock," as and for the purposes set forth.

Third, The arrangement of the boilers, J J', with the surrounding envelope, substantially as shown and described, so that the resultant liquids of the boiling may be evaporated, and also employed to cool down the boilers and surrounding envelope, as set forth.

Fourth, The arrangement of the basin, g g, below the boiler, to receive the falling liquid, as and for the purposes described.

Fifth, We claim the injection of the steam arising from the boiling of the alkaline and other contents of boiler, J', into the boiler, J, and vice versa, substantially as and for the purposes shown and described.

Sixth, We claim the arrangement of the warming chamber, s, between the two boilers, and the combination therewith of the pipes, T V W W, as and for the purposes described.

Seventh, We claim the arrangement and combination of the boilers, J J', furnace, A, and doors, D D' E E' F F', so as to apply the furnace heat to either or both boilers at pleasure, substantially as shown and described.

Eighth, We claim the combination of the cylindrical-bottomed vats, K K', having the chimneys, N N, passing through them with the boilers, J J', as and for the purposes described.

J. B. Palser and Gardner Howland, of Fort Edward, N. Y., for an Improvement in the Manufacture of Paper Pulp. Patented June 21, 1859:

We claim the destruction or carbonization of the gummy, resinous, and other matters from which the fiber is to be set free, without injury to the fiber itself, by the process described.

H. Baldwin, Jr., of Washington, D. C., assignee of J. E. Neisen, of Buffalo, N. Y., for an Improvement in Harvesters and Binders. Patented Aug. 27, 1853:

I claim, first, In combination with the cutting apparatus, the endless apron, C, having an intermittent motion for the purpose of carrying the cut grain to the binding hooks at intervals, and in proper quantity, to form a sheaf, substantially as described.

Second, The binding hooks, D, or their equivalents, for gathering the cut grain in bundles or sheaves, arranged and operating substantially as described.

Third, The combination of the endless intermittently moving apron, C, with the binding hooks, D, substantially as described.

Fourth, The combination of the discharging roller, Z, with the apparatus for gathering and compressing the cut grain into sheaves, substantially as described.

H. Baldwin, Jr., of Washington, D. C., assignee of J. E. Neisen, of Buffalo, N. Y, for an Improvement in Harvesters and Binders. Patented Aug. 27, 1853:

I claim, first, Constructing the blade of the cutter of a reaping or mowing machine with a projection or rib, e, or its equivalent for the purpose of strengthening it, substantially as described.

Second, The combination of a scolloped cutter, having the projections or ribs, e, or their equivalents, on its blade, with the slotted fingers through which the blade, with its projections, is arranged to play, substantially in the manner and for the purposes described.

Third, The combination of the angular projections or ribs, e, or their equivalents, on the blade, with corresponding angular shoulders in the slot of the finger, substantially as described, the shoulders and projections being so arranged that the angles of one will vibrate past those of the other, in such near proximity as to facilitate the detachment and discharge of clogging matter, substantially as described.

EXTENSIONS.

Norman Sheldon and Jane Cary, of Chili, N. Y., executors of Daniel Cary (deceased), late of Clarkson, N. Y., for an Improvement in Horse-powers. Patented June 27, 1846:

I claim the special arrangement and combination of the gearing, as set forth, said gearing consisting of the single large wheel, A, driving two pinions, C C, on the shafts of the two horizontal wheels, E, which horizontal wheels gear into two pinions, J J, on the line shaft, there being a bridge, D, to admit of the pressure of the line shaft; the whole arrangement being substantially the same with that represented and made known.

W. D. Dutcher, of Milford, Mass., for an Improvement in Looms. Patented June 27, 1846; re-issued April 21, 1857:

I claim supporting the wag-staff at its lower end, so that it may slide longitudinally in connection with supporting it other respects by a joint link, or its equivalent, applied so as to cause that part of the staff which strikes the shuttle to move in a line parallel or about parallel to the race-beam, as specified.

And I also claim connecting the lower end of the two staffs below their fulcra, by means of a spring having an intermittent action for drawing them back, in combination with the application of a positive motion above for driving the shuttle, whereby the returning staff aids in arresting the momentum of the shuttle, substantially as described.

John McMullen, of Baltimore, Md., for an Improvement in Netting Machines. Patented June 27, 1846:

I claim, first, The forming of a true fisherman's or weaver's knot in netting, woven in a loom, by bearing a regular warp from the yarn to the cloth-beam, and the forming of loops thereon of the nature of those described, through which loops a thread of filling is thrown by a shuttle, these operations being effected under an arrangement of parts substantially the same with that set forth.

I claim the combination of parts, as made known, for giving motion to the thread-conductors, so as to wind the threads of warp, beamed as described, around the teeth, n n' and o, in such manner as to constitute a loop such as is represented in Fig. 13, leaving a middle thread, c'', to be carried up by the forked teeth. I do not claim the use of thread-conductors for winding threads around teeth, they having been used in other manners and for other purposes; but I limit my claim in this particular to the arrangement and combination of parts, by which I form, simultaneously, a series of loops of the particular kind described, for producing the so-called fisherman's knot.

I claim the employment of the bearers and forked teeth, r r', which are made to raise the thread, c'', and then to open out, so as to leave spaces between the threads, a'' and c'', through which a thread of filling is to be thrown by a shuttle.

I claim the employment of the reed, as described, with its hooked teeth, as combined with my machine, for drawing up the thread of filling against the teeth, o, to aid by its respective movements, made known, in the regular formation of the knots.

I claim the taking-up of the warp that is liberated in the drawing up or tying of the knots, whether the same be effected by the action of the weight, P, operating on a pulley, Q, and the other parts concerned in giving the reversed motion to the yarn-beam at the proper time, or by the aid of a roller or other analagous device, made to raise or depress the warp between the yarn-beam and the thread-conductors, or in any other way that is substantially the same, producing a like effect by analagous means; and I do hereby declare that I do not intend, by the foregoing claim, to limit myself to the particular form of the respective parts described, or to the particular position of the angles of the meshes, but to vary these as I may think expedient, whilst I do not depart from the general principle upon which my machine is made to operate, as set forth.

DESIGNS.

H. C. Foster, of Worcester, Mass., for a Design for Spoon Handles.

S. H. Ransom, of Albany, N. Y., for a Design for a Cooking Stove (2 cases).

S. H. Ransom, of Albany, N. Y., for a Design for a Parlor Stove.

Isaac De Zouche (assignor to Bridge, Beach & Co), of St Louis, Mo., for a Design for a Stove.

Garrettson Smith and Henry Brown (assignors to Abbott and Noble), of Philadelphia, Pa., for a Design for a Cook's Stove (2 cases).

G. Smith and H. Brown (assignors to Liebrandt & McDowell), of Philadelphia, Pa., for a Design for a Cooking Stove (2 cases).

G. Smith and H. Brown (assignors to Abbott & Brown), of Philadelphia, Pa., for a Design for a Cook's Stove.

G. Smith and H. Brown (assignors to Cox, Whiteman & Cox), of Philadelphia, Pa., for a Design for a Cook's Stove.

Notes and Queries

CORRESPONDENTS sending communications for publication in our columns are requested to avoid writing on both sides of a sheet of paper. This fault, though common to persons unaccustomed to writing for the press, gives great trouble to the printer (especially in long articles), and, when combined with illegibility of handwriting, often causes interesting contributions to be regretfully consigned to our waste-paper basket.

L. D., of Mass.—We have heard of steel and iron having been deposited by the electrotype process, but have never seen a single sample of such electro-plating, and we very much doubt if it can be done. This opinion is based upon the fact that steel is an alloy—not a pure metal.

G. P., of Mass.—There is no way known to us for preserving currants with their exact natural color and taste, but they can be preserved for pies and other purposes, without injury to their quality, by placing them in glass or stone-ware jars filled to the top with hot sugar sirup. The sirup is made with one pound of white sugar to a pint of water, and is poured on boiling hot, and the jars sealed up tight when the air bubbles cease to rise from the sirup. Peaches and plums may also be preserved in the same manner.

C. L., of Ind.—Boxes made of zinc, for containing water in refrigerators, are dangerous contrivances, because, as you state, the water decomposes the metal and forms the oxyd of zinc, an injurious salt if taken into the human stomach. Neither water nor milk should ever be kept in zinc or lead vessels. Some years ago, zinc milk-basins were employed in some of the large dairies in England, and they led to several cases of poisoning by the metal being decomposed by the lactic acid in the milk, thus forming a poisonous salt.

G. W. R., of Miss.—Your plan of carrying the heat from your furnaces over the top of the boiler, so as to save fuel, will accomplish the object, but we are adverse to advising you to do so, because the heat may be too high above the water-line, and the boiler thereby injured and rendered unsafe. You should use two or three fire-bridges under the boiler, and thus retain the heat for a longer time in contact with the water surfaces.

G. H. J., of N. Y.—Mr. Colburn, in his able essay on boiler explosions, discards the idea that explosions are ever caused by superheated steam generating a great quantity of common steam from water suddenly thrown among it. He reasons correctly on this head, because superheated steam contains such a small excess of specific heat.

O A., of Ind.—If you employ a half-inch or even a quarter-inch iron rod, extend it ten feet above your chimney, connect it perfectly by sockets, and carry it into the moist ground, you need not have any apprehensions of danger. If your house is large, use a rod at each end, and connect the two by a lateral branch. Be sure and allow no large mass of metal to be near the rods, and make them fast with cleets of dry varnished wood. Copper is the best conductor. Any mechanic or farmer can put up his own lightning rod by following the above directions, of course, the thicker the rod the better the conductor.

W. G. R., of Mass.—We have no reliable data as to the use of zinc-coated iron pipes being superior to lead pipe, for conveying water to be used for domestic purposes. Pure zinc is a very oxydizable metal and is more readily decomposed with water than iron; but when combined with iron by the galvanizing method, it may resist the action of water in a very superior manner. Experience alone can settle this question, and some of our readers may be able to solve it.

H. C. F., of Mass.—French polish is made by dissolving 5 pounds of pale shellac and ¼ pound of mastic in alcohol.

F. T. W., of Ala.—Asphalt dissolved in hot linseed oil and thinned with turpentine makes a good cement for painting a leaky tin roof, without injuriously affecting the water that may fall upon it. White lead thinned with oil and made into the consistency of soft putty, with fine sand or ground glass, makes a most enduring cement for leaks in roofs, but before it becomes perfectly dry, it is liable to affect the rain-water injuriously, if used for cooking.

W. B. G., of N. Y.—Be pleased to give us your ideas on the best form of ships. There are so many different opinions among nautical men on this point that it appears to us they have no recognized principles to guide them.

T. S. H., of N. C.—The article on balancing machinery was credited to the London "Journal of the Society of Arts." Pulleys may be balanced by removing the surplus metal from the heavy part. Although an iron or wooden pulley may be turned perfectly true, some parts of it may be more dense than others, and of course it will be unbalanced. All pulleys or wheels should be spun on a free spindle, to ascertain if they are truly balanced, before they are put on.

T. S. B., of N. Y.—There is an engine operated by compressed air which has been working in a coal mine near Glasgow, Scotland, for several years. The air is compressed by a steam engine at the top of the pit, and forced down through a tube. The object of this arrangement is to obviate the use of fire in the mine. If you can render your method of operating an Ericsson engine with compressed air economically practicable, you should do it as soon as possible.

T. F. C., of Mass.—We have frequently heard of sulphur being found on the surface of the ground in Virginia and other places after thunder-storms, but we cannot account for its presence. In the case at Amesbury, Mass., it seems to have been deposited from the rain; in other cases, it is supposed to have been brought from the interior of the earth to the surface of the ground by lightning.

F. S., of C.W.—A colored person might obtain a patent for his invention, but it is a matter of doubt about his being able to sustain it against infringers, in view of the Dred Scott decision. We are not prepared to answer the question fully, as there is no adjudicated case which settles this exact question. We suppose the Commissioner of Patents, if addressed upon the subject, would give the advice you seek.

MONEY RECEIVED

At the Scientific American Office on account of Patent Office business, for the week ending Saturday, July 7, 1860:—

S. B. L., of Pa., $25; S. W. M., of N. Y., $110; J. S. B. R. of N. J., $25; J. H., of Mich., $30; L. & L., of N. Y., $25; A. J. K., of Iowa, $30; F. M., of Miss., $30; L. A. F. De C., of N. Y., $325; C. B. M., of Wis., $25; L. C. H., of N. Y., $30; H. & S. of N. Y., $30; H. P. C., of Mich., $15; N. S., of Ill., $30; J. W., of N. Y., $25; M. L. C., of N. Y., $25; J. L. N., of N. Y., $30; J. H., of Pa., $30; J. B. C., of Ohio, $30; G. K. P., of Mass., $25; E. D., of Mass., $25; J. P. M., of Ill., $25; F. Z. N., of Conn., $30; T. H. B., of N. Y., $15; J. S. S., of N. Y., $30; J. W., of N. Y., $25; R. C. B., of N. Y., $43; W. T., of N. Y., $25; J. C. G., of Mass., $35; C. & B., of Mass., $30; W. R., of N. Y., $20; P. K., of R. I., $30; J. B. T., of Ill., $45; I. G., of Pa., $30; O. P. B., of N. Y., $10; W. H. R., of N. Y., $20; W. E. McI., of Mass., $25; B. R., of Ga., $30; J. R. McD., of Mo., $25; E. E., of Ill., $25; W. & F., of Tenn., $100; L. W. N., of N. Y., $25; F. S. B., of N. Y., $30 A. & J. L., of Va., $30; M. B., of Ohio, $25; J. R. H., of Maine, $30; S. G., of Ill., $25; L. S. & J. E., of N. Y., $35; D. C. T., of N. Y., $25; A. P. C., of Ill., $30; D. & C., of N. Y., $30; R. H. M., of N. Y., $250; L. W. N., of N. Y., $25; F. W., of N. Y., $25; J. R., of N. J., $30; J. W. T., of Vt., $30; J. C. L., of Ill., $30; J. S., of N. Y., $25; H. P. F., of Maine, $30; E. J. F., of Mo., $30; J. B. D., of N. Y., $60; C. D., of Mass., $30; E. C., of La., $30; G. L. T., of N. Y., $10; J. C. R., of Pa., $25; C. V. S., of Ill., $35; W. S. L., of Ohio, $14; W. T., of N. Y., $25; J. H. W., of N. J., $30; S. & O. P., of Mich., $30; H. N., of N. Y., $25; J. B. L., of Conn., $35; W. W. S., of Iowa, $25; F. G., of Mich., $30; M. & C., of Ill., $30; W. F. J., of Pa., $40; W. H. R., of N. Y., $12; D. S. H., of N. Y., $25.

Specifications, drawings and models belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, July 7, 1860:—

J. W., of N. Y.; W. R., of N. Y.; C. B. M., of Wis.; W. T., of N. Y.; J. C. G., of Mass.; F. S. B., of N. Y.; H. P. C., of Mich.; J. C. R., of Pa.; H. N., of Ky.; E. D., of Mass.; J. P. M., of Ill.; W. H. P., of N. Y.; D. S. H., of N. Y.; S. B. L., of Pa.; J. S. B. R., of N. J.; C. D., of Mass.; J. S., of N. Y.; L. & L., of N. Y.; W. S. L., of Mich.; J. R. McD., of Mo.; L. S. & J. E., of N. Y.; J. B. L., of Conn.; W. W. S., of Iowa; R. C. B., of N. Y.; W. T., of N. Y.; L. W. N., of N. Y.; M. C., of Mass.; W. E. McI., of Mass.; M. L. C., of N. Y.; P. K., of R. I.; M. B., of Ohio; E. E., of Mich.; C. V. S., of Ill.; G. K. P., of Mass.; M. A. W., of Cal.; D. C. T., of Wis.; F. W., of N. Y.

NEW BOOKS AND PERIODICALS RECEIVED.

MILCH COWS AND DAIRY FARMING: Comprising the Breeds, Breeding and Management in health and disease of dairy and other stock, the selection of milch cows, with a full explanation of Guenon's Method, &c.; the production of milk, butter, and cheese; with a treatise upon the dairy husbandry of Holland; to which is added Horsfall's system of dairy management, by Charles L. Flint, &c. Liberally illustrated. Crosby, Nichols, Lee & Co., Boston; W. J. Pooley & Co., New York.

GRASSES AND FORAGE PLANTS: A Practical Treatise, comprising their Natural History, comparative value, methods of cultivating, cutting and curing, &c. By Charles L. Flint, Secretary of the Massachusetts Board of Agriculture, &c., with 170 illustrations. Fifth edition, revised and enlarged. Crosby, Nichols, Lee & Co., Boston; W. J. Pooley & Co., New York.

The above two works are thoroughly practical, and worthy of all praise. We heartily commend them to the attention of all those who feel interested in those subjects.

THE YOUNG FARMER'S MANUAL. Published by C. M. Saxton, Barker & Co., No. 25 Park-row, New York.

This volume details the manipulations of the farm in a plain and intelligible manner, with practical directions for laying out a farm and erecting buildings, fences, and farm gates; embracing also the "Young Farmer's Workshop," a division of the subject in which full directions are given for the selection of good farm and shop tools, their uses and manufacture; the whole work is adorned by numerous engravings of fences, gates and tools for performing nearly every branch of farming operations; and the volume forms a most excellent book-of-reference which we can earnestly recommend. The author is S. Edwards Todd.

USEFUL HINTS TO OUR READERS.

BOUND VOLUMES.—Persons desiring the first volume of the New Series of the SCIENTIFIC AMERICAN can be supplied at the office of publication, and by all the periodical dealers; price, $1.50; by mail, $2, which includes postage. The volume, in sheets, complete, can be furnished by mail; price $1. Vol. II. is now bound and ready for delivery. The price for this volume is the same as that charged for Vol. I.

BINDING.—We are prepared to bind volumes, in handsome covers, with illuminated sides, and to furnish covers for other binders. Price for binding, 50 cents. Price for covers by mail, 50 cents; by express, or delivered at the office, 40 cents.

SUBSCRIBERS TO THE SCIENTIFIC AMERICAN who fail to get their papers regularly will oblige the publishers by stating their complaints in writing. Those who may have missed certain numbers can have them supplied by addressing a note to the office of publication.

RATES OF ADVERTISING.

THIRTY CENTS per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns; and, as heretofore, the publishers reserve to themselves the right to reject any advertisement sent for publication.

IMPORTANT TO INVENTORS.

THE GREAT AMERICAN AND FOREIGN PATENT AGENCY.—Messrs. MUNN & CO., Proprietors of the SCIENTIFIC AMERICAN, are happy to announce the engagement of HON. CHARLES MASON, formerly Commissioner of Patents, as associate counsel with them in the prosecution of their extensive patent business. This connection renders their facilities still more ample than they have ever previously been for procuring Letters Patent, and attending to the various other departments of business pertaining to patents, such as Extensions, Appeals before the United States Court, Interferences, Opinions relative to Infringements, &c., &c. The long experience Messrs. MUNN & Co. have had in preparing Specifications and Drawings, extending over a period of fifteen years, has rendered them perfectly conversant with the mode of doing business at the United States Patent Office, and with the greater part of the inventions which have been patented. Information concerning the patentability of inventions is freely given, without charge, on sending a model or drawing and description to this office.

Consultation may be had with the firm, between NINE AND FOUR o'clock, daily, at their PRINCIPAL OFFICE, No. 37 PARK ROW, New YORK. We have also established a BRANCH OFFICE in the CITY OF WASHINGTON, on the CORNER OF F AND SEVENTH-STREETS, opposite the United States Patent Office. This office is under the general superintendence of one of the firm, and is in daily communication with the Principal Office in New York, and personal attention will be given at the Patent Office to all such cases as may require it. Inventors and others who may visit Washington, having business at the Patent Office, are cordially invited to call at their office.

They are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business they have Offices at Nos. 66 Chancery Lane, London; 29 Boulevard St. Martin, Paris, and 26 Rue des Eperonniers, Brussels. We think we may safely say that three-fourths of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

A pamphlet of information concerning the proper course to be pursued in obtaining patents through their Agency, the requirements of the Patent Office, &c., may be had gratis upon application at the Principal Office or either of the Branches. They also furnish a Circular of Information about Foreign Patents.

The annexed letters, from the last three Commissioners of Patents, we commend to the perusal of all persons interested in obtaining Patents:—

Messrs. MUNN & CO.:—I take pleasure in stating that while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill and fidelity to the interests of your employers. Yours, very truly,

CHAS. MASON.

Immediately after the appointment of Mr. Holt to the office of Postmaster-General of the United States, he addressed to us the subjoined very gratifying testimonial:—

Messrs. MUNN & Co.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you have discharged your duties of Solicitors of Patents while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and, I doubt not, justly deserved) the reputation of energy, marked ability and uncompromising fidelity in performing your professional engagements. Very respectfully,

Your obedient servant, J. HOLT.

Messrs. MUNN & Co.:—Gentlemen: It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency, and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully,

Your obedient servant, WM. D. BISHOP.

Communications and remittances should be addressed to

MUNN & CO.
Publishers, No. 37 Park-row, New York.

STEAM HAMMERS — THE UNDERSIGNED, makers of the celebrated Nasmyth hammers, having a full assortment of patterns, continue to furnish them at reduced prices, and of any size, from 5 cwt. upwards. The large number hitherto made by them, and in successful operation, precludes the necessity of presenting any recommendations. They are also patentees and exclusive makers, for this country, of what is generally known as the "Condie," or inverted hammer, one of which of six tons, falling six feet, has been in operation at the Franklin Forge, New York, since 1849. [1 eowtf] MERRICK & SONS, Philadelphia.

$50.—SEVERAL STATE RIGHTS FOR A valuable (premium) patent for sale cheap. Address Box 87, Brooklyn, N. Y. 1*

PATENT CORK-CUTTING MACHINES.—State rights for several States for sale to use our new patent machines. With one machine a gross of corks of different sizes can be made in one minute. Call and see them in successful operation at the Cork Factory, No. 43 Center-street, New York. 3 2* S. W. SMITH & CO.

STEPHENS' DYES FOR WOOD—IMITATING black walnut, mahogany, satinwood, rosewood or oak. Specimens sent on receipt of 15 cents. C. J. REILLY, No. 70 William-street, New York. 3 16*

TWO NEW INVENTIONS.—A CHEAP AND impervious covering, deodorizing and anti-putrifactive patentable compound for the better preservation of hams and other meats for home or exportation. Also a new drier for zinc paint and raw oil alone, that will receive a second coat on the following day. For purchase or interest in the above apply personally by appointment, or by letter, to T. HODGSON, No. 7 Beach-place, Brooklyn, N. Y. 1*

FOR SALE—TWO LARGE TRIP HAMMERS; one new and one second-hand (as good as new). For full description see advertisement in SCIENTIFIC AMERICAN. 3 12* J. C. HOADLEY, Lawrence, Mass.

FOR SALE—A STATIONARY STEAM ENGINE, 7x15, 10-horse power, with boiler and all appurtenances; has been in use three months; in perfect order. An excellent engine. Particulars on application. J. C. HOADLEY, Lawrence, Mass. 3 13*

FOR SALE—A SECOND-HAND SHOP CRANE; very convenient. J. C. HOADLEY, Lawrence, Mass. 3 3*

FOR SALE—SMALL VERTICAL HAND drillers to fasten to benches; very cheap and convenient. 3 3* J. C. HOADLEY, Lawrence, Mass.

FOR SALE—A GROOVING MACHINE FOR working wood; second-hand; in perfect order. 3 3* J. C. HOADLEY, Lawrence, Mass.

FOR SALE—STEEL TURNING AND PLANING tools; cheap and good as new. 3 3* J. C. HOADLEY, Lawrence, Mass.

FOR SALE—A DOUBLE HORIZONTAL STEAM engine, 18x36, 100-horse power; has been in use one year; in perfect order. Three boilers and all appurtenances. Particulars on application. [3 13*] J. C. HOADLEY, Lawrence, Mass.

FOR SALE—TWO LARGE TRIP HAMMERS; one new and one second-hand, as good as new; whole weight, 10,285 lbs.; weight of head, without die, 100 lbs.; weight of die, 12 lbs.; full speed, 200 strokes per minute; ordinary speed, 150 strokes per minute; four tappets—speed of tappet shaft, 50 revolutions per minute; lift at ordinary speed, 9 to 10 inches; belt wheel, 42 inches diameter 6¾ inches face; length from center of tappet shaft to center of dies, 93¾ inches; length from center of fulcrum to center of dies, 60 inches. [1*] J. C. HOADLEY, Lawrence, Mass.

FOR SALE—ONE SECOND-HAND NO. 3 punch press, Fowler pattern; one drop hammer, 1,200 lb. bed, Fowler pattern; a complete set of upright steam engine patterns, modern style; a complete set of mortise machine patterns (see SCIENTIFIC AMERICAN, Vol. III., page 220). One Smee's electro-plating battery; size of plates, 4x7; all the apparatus complete. All of the above, with various other useful patterns, will be sold very low, and will pay any one wanting either of the above articles for his journey in purchasing. Address J. W. B., Box 186, Hartford, Conn. 1*

MODELS—IN EITHER WOOD OR METAL, for the Patent Office. HENRY J. BEHRENS, 3 5* No. 170 Chatham-street, in the rear.

$1 COPYING PRESS—WITH BOOK FOR copying business-letters instantly and perfectly, is sent postpaid by the manufacturer for $1.27. Agents wanted. Address, with stamp— J. H. ATWATER, Manufacturer. 3 4* Providence, R. I.

TENNESSEE STATE FAIR OPENS AT NASHville, Sept. 10, 1860.—$500 each is offered for the best blood stallion, harness stallion, Durham bull and jack, besides large premiums on fat cattle and all other domestic animals, and on all manufactured articles in every useful department of human ingenuity. Competition is invited from the whole Union, and no entry fee is charged. Programmes may be had free on application to L. P. Williams, Secretary, at Nashville.

THOMAS B. JOHNSON, 3 2* Treasurer Tennessee State Fair.

SECOND-HAND MACHINE TOOLS.—ONE geared turning engine, 10 foot slides; one good gear-cutting engine; one iron planer, slides 6 feet 9 inches; one geared lathe, with screw chuck and slide rest—will swing 30 inches, and take in 14 feet shaft: for sale low at Arnold's machine-shop. Models—operating or for the Patent Office—made of either wood, glass or metal by BENJAMIN ARNOLD, East Greenwich, R. I. 1*

A NEW SCIENTIFIC CATALOGUE.—D. APPLETON & CO., Nos. 443 and 445 Broadway, New York, have just published a new catalogue of the latest works in every department of science and art, making 76 pages 8vo. It will be sent to any address on receipt of a 3-cent stamp.

HAVANA (CUBA) DIRECTORY CONTAINS several thousand names and addresses, plan of Havana, railroad map of Cuba, laws, particulars of all companies, &c. Illustrated. By mail, $1. 1* C. J. FOX, No. 681 Broadway, New York.

INSTRUMENTS.—CATALOGUE (6TH EDITION), containing over 250 illustrations of Mathematical, Optical and Philosophical Instruments, with attachment of a large sheet representing the Swiss Instruments in their actual size and shape, will be delivered, on application, to all parts of the United States, by sending 12 cents in postage stamps. C. T. AMSLER,
No. 625 Chestnut-street, Philadelphia.
Catalogues, without the large sheet of Swiss Instruments, furnished gratis, on application. 18 6eow*

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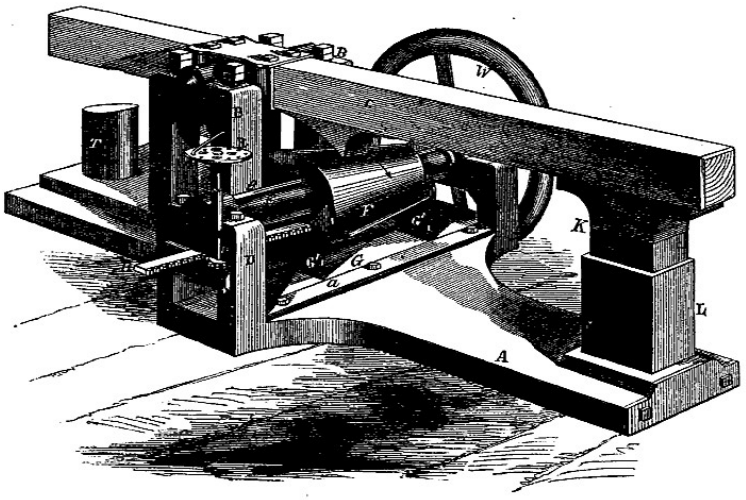
HOWELLS' IMPROVED TRIP-HAMMER.

The accompanying illustration is a perspective view of an improvement in trip-hammers for which a patent was granted on the 10th of last April. The invention consists in the employment of an adjustable cone cam, as the lifting device of the hammer, by which the force of the blow is graduated in the most simple and efficient manner to suit different kinds of work in forging, and also to suit the strength of blow required at different stages of any work under the hammer. A, is the base block or sole plate; B B are pillar blocks forming supports and fulcrums for the hammer, C. The cone cam, F, for lifting the hammer, is secured on a rotating shaft E, which has its bearings in the pillar blocks, D. The cone cam is made with regularly tapering sides. There are two feathers, *e*, on the cam shaft, E, which permit the cam, F, to slide freely endwise, but which carry round the cam when the shaft revolves. G is a peculiar clutch; it has a bolster, G′, standing up at each end of the cam, F, and a bottom plate adapted to slide in the bed plate, A, between the guide strips, *a a*. This slide clutch is attached to the rack bar, H, into which the pinion, P, of the vertical rod and gage plate, R, gears. K is the hammer head; L, the anvil; T, the usual tail block; and W, a fly wheel, which regulates the action of the hammer, whereby it is operated in a superior manner without any jarring.



HOWELL'S IMPROVED TRIP-HAMMER.

It will be observed that, by taking out the catch pin in the gage plate, R, and turning the spindle of the pinion, P, the rack bar, H, will move the sliding clutch, G, back and forth, and also slide the cone cam, F, on its shaft so as to bring its varying diameter under the hammer, C, to give it the exact lift required to graduate the force of the blow upon the work on the anvil, and under the hammer head. A screw rod or lever may be employed in place of the rack bar and pinion to move the clutch; either of the devices will effect the object. This is a most simple and effectual manner of graduating the force of the blows. A cam weighing 756 lbs. can be slid upon its shaft by a boy. From the engine for operating this hammer, a cord is connected with the throttle valve, and is brought down to the frame, so that the operative can with his left hand, by drawing the cord, regulate the amount of steam, and with his right, move the cam so as to graduate the force of the blow given by the hammer. The cam can be moved rapidly on its shaft so as to forge a strip of metal half-an-inch in thickness, or a bar eight inches thick.

A tapering wedge with a rod attached to it, is used to shove under the helve, when the hammer is to be caught up, and when it is desired to start the hammer, the cam is slid gently back, when the catch wedge can be taken out, and the hammer easily brought into contact with the lifter.

The patentee states that a 400-lb. trip-hammer of this character has been in operation since the 5th of last April; it has been run at a speed of 250 revolutions per minute, and has given great satisfaction. Either a spiral metallic or wooden springs may be employed at the tail block to catch the hammer when it goes from a strong blow to a low one.

The patent for this invention was obtained through the Scientific American Patent Agency, and further information may be obtained by letter addressed to the patentee, David Howell, of Louisville, Ky.

NEW BENCH PLANE.

Although the carpenter's plane is one of the oldest instruments for reducing and smoothing wood, yet it has not hitherto been considered perfect, even after having received quite a number of improving touches during recent years. One well-known defect of the plane is that its cutting *bit* receives more injury during the reverse movement over the surface of a board than during its forward cutting movement. The improvement in bench planes represented by the accompanying engravings is designed to obviate this evil, so that the cutter will not be dulled when it is not doing useful work.

Fig. 1 is a top view of the plane; Fig. 2 is a vertical section of it, and Fig. 3 is an edge view of the plane bits detached from the stocks. There are double bits, *a b*, combined with each other, and the stock, as shown in Fig. 2, viz., the cutting bit, *b*, has a central slit which passes from the upper end about two-thirds of the length thereof. A metallic plate, *f*, which is secured to the after-side of the throat of the plane-stock is of such a shape that it furnishes a metallic bearing surface for the cutting bit, and also the requisite supporting and guiding bearings for the screw, *c*. The screw-shank of *c* is received within a screw aperture in the angular nut *d*,

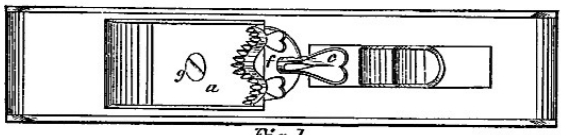
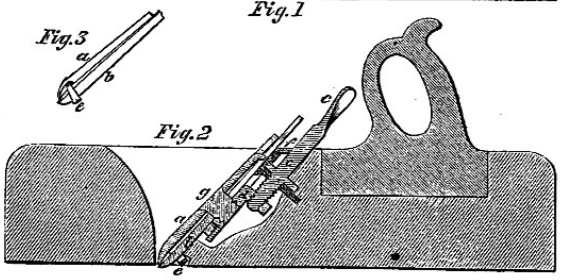


Fig. 1



HUNT'S IMPROVED BENCH PLANE.

which works in a slot in the throat plate, *f*. The cutting bit is confined with the front bit *a*, and with the angular screw, *d*, by the screw, *g*, which passes first through an aperture in the front bit, *a*, then through the slit in the cutting bit, *b*, and then into the aperture in the nut, *d*. It will therefore be perceived that while the two bits, *a b*, can be simultaneously moved outwards or inwards by turning the screw, *c*, the cutting bit can also be readily adjusted, so as to cause its cutting edge to project any desired distance beyond the closely embracing lower end of the front bit, *a*. A protecting metallic strap, *e*, whose turned-up extremities are pivoted to the edges of the lower end of the front bit, *a*, loosely embraces the lower end of the cutting bit, *b*, so that when the plane is shoved forwards, the said strap will swing freely upwards into a notch which is formed in the plane stock for its reception; but when a rearward movement is imparted to the plane, this metallic strap will be drawn outwards to a position that will cause it to elevate the front portion of the plane stock to a sufficient distance above the face of the board that it is operating upon, so as to prevent the cutting bit from touching the face of the board during the reverse movement of the plane. This improvement renders the cutting bit more durable, and more work can be executed with the plane, the cutter not requiring so frequent sharpening.

A patent was granted for the improvement on the 24th of April last, to H. C. Hunt, of Ottumwa, Iowa, from whom more information may be obtained by letter.

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